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Date

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# **HEALTH BEHAVIORS AND PERFORMANCE OF MILITARY WOMEN**

## **YEAR 1 ANNUAL REPORT**

### **INTRODUCTION**

The shift in the U.S. Military from a conscription-based to an all-volunteer force in 1973, along with increased acceptance of women's involvement in traditionally male-dominated occupations, has created new opportunities for an increasing number of women in the Military. In the early 1980s, fewer than 10% of the armed forces were women, but by 1995, the percentage had increased to about 14%.<sup>1</sup> The increasing involvement of women in the Military and changes in the nature of that involvement have raised questions about military women's health, safety, and well-being, as well as the implications of these issues for overall military readiness.

Although the percentage of women in the Military has increased, relatively little is known about their health, performance, and special needs. Prior research on military personnel has largely involved male-only samples, and analyses of studies of the total military population have generally concentrated on military men or the overall military population.

The major objectives of the research being examined as part of this grant are to:

- examine the health of military women in terms of health status, health practices, and health care utilization;
- assess work-related performance of military women; and
- examine relationships between health and performance of military women.

This research draws on data for military women and men from the series of Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel sponsored by the Department of Defense. The series includes six surveys conducted in 1980, 1982, 1985, 1988, 1992, and 1995.<sup>2-7</sup> All of these surveys used statistical probability designs that yielded large sample sizes (from 15,000 to 22,000 respondents) and reasonably high response rates (from 70% to 84%). Consequently, their data provide unbiased estimates of population parameters and permit inferences about the characteristics and behaviors of active-duty military personnel. For year 1 of the grant, most analyses were based on data from the 1995 Worldwide Survey, although data were also analyzed from the earlier surveys to examine trends in health and performance. Comparisons were made between military women and men and among subgroups of military women.

## **BODY**

During the first year of the grant, analyses were conducted that supported the preparation of three papers and the presentation of data at five professional meetings, one of which was an invited paper by a National Academy of Sciences committee. Each of the papers and presentations addresses an aspect of the health and performance of military women consistent with the objectives of the grant. Both descriptive cross-tabulations and multivariate logistic regression analyses were conducted. Copies of each of the papers and slides from the conference presentations are appended to this report. Key findings from the papers and presentations are noted below. Additional papers are in progress and will be completed during the coming year.

### **Completed Papers**

**1. "Stress and Substance Use Among Military Women and Men." Robert M. Bray, John A. Fairbank, and Mary Ellen Marsden. Chapter to appear in F.H. Gabbay, R.J. Ursano, A.E. Norwood, C.S. Fullerton, and C.C. Duncan (Eds.), Sex Differences, Stress, and Military Readiness. Volume II. Bethesda, Maryland: Uniformed Services University of the Health Sciences, Department of Psychiatry.**

Military women and men are subject to a wide range of stressors as part of their military work assignments and duties. This paper examines levels of stress, sources of stress, behaviors for coping with stress, and the relationship between stress and substance use for military women and men. Several findings were considered to be important:

- Heavy alcohol use, illicit drug use, and cigarette use all decreased significantly between 1980 and 1995 for both military women and men. Illicit drug use declined to low levels, but rates of heavy alcohol use and smoking were still a cause for concern. Approximately 1 in 20 military women, but 1 in 5 military men, drank heavily, and 1 in 4 military women and 1 in 3 military men smoked cigarettes.
- About 40% of military women and men reported stress at work, more than in the family or personal relationships. About one-third of military women reported that they experienced high levels of stress from being a woman in the Military. The most frequently mentioned source of stress among military women was being away from family. Most military personnel used problem-focused or approach-oriented coping strategies for dealing with stress.
- Stress at work or in the family or personal relationships was determined to be a significant predictor of substance use among military men. Among military

women, however, only stress associated with being a woman in the Military was associated with substance use. Stress reduction and substance abuse prevention programs may need to be targeted differently for military women and men, and the nature of stressors in the military workplace encountered by military women requires additional study.

**2. "Substance Use Among Military Women and Men, 1980 to 1995." Mary Ellen Marsden and Robert M. Bray. Draft paper to be submitted for publication.**

Substance use has decreased over the past decade for the civilian population and for the military population as a whole, but little is known about the nature of changes in the use of alcohol, illicit drugs, and cigarettes for military women and men. Studies from the civilian sector indicate that rates of use are increasing among youth and may be converging among young women and men. Several findings from this paper were considered to be important:

- Illicit drug use decreased dramatically between 1980 and 1995 for both military women and men, and rates of use were highly similar for both. Heavy drinking decreased slightly, and in each survey year the percentage of heavy drinkers was significantly lower among military women than men. Rates of cigarette smoking also decreased over the period, and rates of use were somewhat similar among military women and men although men's rates were significantly higher in three of the six survey years.
- From 1980 to 1995, the Military became older and better educated, and more of the force was married—factors associated with lower rates of substance use that could partially explain downward trends in rates of use. Analyses that adjusted substance use rates of all surveys to the demographic composition of the Military in 1980 showed that changes in illicit drug use and smoking among military women and men were not accounted for by changes in the demographic composition of the Military. In contrast, changes in the rates of heavy drinking were related to demographic characteristics. Rates of heavy drinking would have been higher and nearly identical if the demographic composition of the Military had remained the same.
- Although substance use decreased among both military women and men over the 1980 to 1995 period, both groups were still exposed to health risks associated with substance use. Further investigation is needed of the military conditions associated with substance use and its impact on work performance and health for women and men.



**3. "The Effects of Stress and Coping Style on Health Risk Behaviors and Functioning in Military Women." Carol S. Camlin, Robert M. Bray, and John A. Fairbank. Draft paper to be submitted for publication.** (Portions of these data were also presented at the 104th Annual Convention of the American Psychological Association, Toronto, Canada, August 1996).

Military women are exposed to a wide range of stressors as a part of military work assignments, and they may also experience stressors unique to being a woman in a predominantly male work environment. Little is known, however, about the relationship of stress and coping styles on adverse health outcomes and the characteristics of women who are most at risk of stress-related problems. In this paper, stressors were divided into five independent types: work-related stress, family-related stress, financial stress, health-related stress, and perpetration of violence. For each of these, coping styles were examined to determine how they mediate the effects of these stressors on impaired work performance, symptoms of depression, and substance use problems (moderate to heavy and heavy drinking, heavy cigarette use, and illicit drug use) in military women. The effects of demographic factors were also examined, including age, race/ethnicity, service, job status, and marital status. Several findings were considered to be important:

- Depression, work-related stress, and health-related stress were strongly predictive of impaired work performance and were not mediated by coping style.
- Women who experienced significant work-related stress were more than 2½ times more likely than their counterparts to report symptoms of depression in the past year. Family-related, financial, and health-related stress were also significant predictors of depression, as was being a perpetrator of violence. A negative coping style independently predicted depression, and those who experienced health-related stress and had a negative coping style were almost five times more likely than others to report depression.
- Many demographic characteristics emerged as significant predictors of moderate to heavy or heavy alcohol use. Those who were white and were heavy smokers were twice as likely as others to drink heavily. Those who were in the officer pay grades rather than enlisted, as well as those who were unmarried and had a high school education or less, were more likely to drink more heavily. Financial stress and being a perpetrator of violence also emerged as significant predictors of moderate to heavy or heavy drinking.
- Similarly, experiencing financial stress, being a perpetrator of violence, and being a heavy smoker predicted the use of illicit drugs in the past year. These factors were not mediated by coping style.

- In contrast, coping style appeared to strongly mediate the effects of work-related stress and health-related stress on heavy smoking. Those experiencing work-related stress and having a negative coping style were more than four times more likely than others to be a heavy smoker. Those experiencing financial stress were almost twice more likely to be heavy smokers, and as would be expected, those who were heavy drinkers were more likely to be heavy smokers as well. Those with lower levels of education, who were white, and age 35 or older were also more likely than others to be heavy smokers.

In summary, stressors were highly predictive of a range of adverse psychosocial and functional outcomes, including depression, impaired work performance and substance use problems. Demographic predictors varied by type of outcome; however, some trends were apparent in the substance use measures: women who were unmarried, and who had a high school education or less, appeared to be more at risk of substance use problem behaviors. Coping style appeared to interact with some stressors in affecting certain psychosocial and functional outcomes; however, the relationship between stressors and adverse health outcomes was not always mediated by a positive coping style.

## **Presentations**

**1. "Comparisons of Heavy Alcohol Use Among Military and Civilian Men and Women, 1985-1992." Robert M. Bray, Mary Ellen Marsden, and Larry A. Kroutil. Paper presented at the 123rd Annual Meeting of the American Public Health Association, San Diego, California, October 1995.**

Several significant findings were presented:

- Rates of heavy alcohol use were decreasing during the 1985 to 1992 period among both military men and women, and rates were more stable among civilians. Military rates were consistently higher than civilian standardized rates, although the gap was narrowing. Military men and women were about twice as likely as civilian women to be heavy drinkers. Heavy drinking was most likely among young military men (aged 18 to 25).
- Decreases in heavy drinking in the Military were not all associated with changes in the demographic composition of the military population. Military-civilian differences were likely associated with differences between military personnel and civilians in living conditions and norms about drinking.

**2. "Substance Use and Health Among Military Women and Men." Mary Ellen Marsden, Robert M. Bray, and Larry A. Kroutil. Paper presented at 104th Annual Convention of the American Psychological Association, Toronto, Canada, August 10, 1996.**

Several significant findings were presented:

- Military women were more likely than military men in 1995 to report poorer health and days of restricted activity associated with poor physical or mental health. They were also more likely to report outpatient physician visits and hospitalizations, although the differences were not large.
- Among military women, heavy alcohol use was a significant predictor of outpatient physician visits and days of restricted activity; illicit drug use and cigarette smoking were not significant predictors of health status and health care utilization. Among men, illicit drug use was a significant predictor of illness and restricted activity, while cigarette smoking was a significant predictor of restricted activity.

**3. "The Effects of Stress and Coping Style on Health Status and Domains of Functioning in Military Women." Carol S. Camlin, Robert M. Bray, and John A. Fairbank. Paper presented at the 104th Annual Convention of the American Psychological Association, Toronto, Canada, August 1996.**

Key findings from this presentation are described above as part of paper #2.

**4. "Health, Fitness, and Nutrition Among Military Women and Men." Robert M. Bray and Mary Ellen Marsden. Paper presented at Workshop on Assessing Readiness in Military Women: The Relationship to Nutrition, sponsored by National Academies of Science and Engineering, Irvine, California, September 9, 1996.**

In this paper, data were considered on health, fitness, and nutrition among military women and men from the 1992 and 1995 Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel. From these data, health status, health practices, food consumption behaviors, health risk perceptions, and behavior changes from awareness of potential or actual health problems were examined.

Several findings were considered to be key:

- The demographic composition differed among military women and men; specifically, military women were more likely than men to be younger, African American, somewhat better educated, and single.
- Military women were more likely than military men to report poorer health and more days of restricted activity from physical or mental health problems.
- Both women and men were aware of risks of poor health practices, but they differed in the likelihood of engaging in these actions. Women were less likely than men to be substance users, but also less likely to engage in other healthy behaviors, such as strenuous exercise and eating at least two meals a day; women were also less likely than men to eat high cholesterol foods.
- Both military women and men who had high blood pressure or who were overweight followed medical advice; fewer women and men changed smoking or exercise habits when advised to do so.

The findings regarding poorer health among military women than men were generally consistent with those from civilian studies. Although the differences were statistically significant, they were not large. Substance use was less likely to affect the work performance of military women than military men, but military women were less likely to engage in other sound health practices associated with productivity at work. These findings suggest areas where education and intervention efforts to improve health might be profitably directed.

**5. "Health and Health Care Utilization of Military Women and Men." Robert M. Bray and Mary Ellen Marsden. Paper presented at Conference on Psychosocial and Behavioral Factors in Women's Health: Research, Prevention, Treatment, and Service Delivery, sponsored by American Psychological Association and other agencies, September 19, 1996.**

Several significant findings were presented:

- Military women were more likely than military men in 1995 to report poorer health and restricted activity. They were also less likely to be substance users and less likely to engage in certain health practices, such as strenuous exercise and eating at least two meals a day.
- Military women were more likely than military men to report easy access to medical care, but the majority of men and women reported that it is easy.

- The majority of both military women and men were satisfied with the quality of medical care they receive in the Military.
- Military women were more likely than military men to use health services.

### **Plans for the Coming Year**

During the second year of this 2-year grant, draft papers and the findings reported in the presentations will be completed, and papers will be sent to professional journals for review. Analyses on the following types of issues for military women and men will also be conducted:

- the impact of deployment on health, including substance use, access to health services, and health care utilization;
- variation in health status and health practices among occupational groups and pay grades;
- predictors of health care utilization, including health status, health practices, and access to health services;
- the impact of health status on work performance, including days lost and performance level; and
- comparative rates of substance use among military and civilian women and men.

Results of these analyses will also be sent to journals for review.

### **CONCLUSIONS**

Findings from the analyses conducted during year 1 of this grant show new and important relationships between substance use and stress, between coping style and stress, and key differences between women and men in health status and health care utilization. Military women and men have both shown significant reductions in alcohol use, illicit drug use and cigarette use between 1980 and 1995. Illicit drug use has declined to low levels, but rates of heavy alcohol use, particularly for men, and smoking both for women and men are still cause for concern. Many women (and men) report high levels of stress at work and/or associated with being a woman in the Military. Stress at work or in the family is related to substance use for men, but only stress due to being a woman in the Military is associated with substance use for women.

Stressors were also highly predictive of a range of adverse psychosocial and functional outcomes, including depression, impaired work performance, and substance use problems. Analyses revealed that the relationship of coping style and stressors is complex. Coping style interacts with some stressors in affecting certain psychosocial and functional outcomes, but not with others.

There are consistent differences in the health status and health care utilization of military women and men across a variety of indicators that may have important implications for military readiness. Military women are more likely than military men to report poorer health status and consistently show higher rates of health care utilization, differences that may affect work performance and productivity. These differences between military women and men are consistent with findings reported on the health and health care utilization of civilians, but have important implications for the Military as the percentage of women in the Military has increased.

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**APPENDIX A**  
**BOOK AND JOURNAL MANUSCRIPTS**



**Stress and Substance Use Among  
Military Women and Men**

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The views, opinions, and findings contained in this chapter are those of the authors and should not be construed as an official Department of Defense position, policy, or decision, unless so designated by other official documentation. The authors gratefully acknowledge the contribution of Dr. Sara C. Wheelless who was responsible for overseeing statistical programming in connection with this research.

## **Stress and Substance Use Among Military Women and Men**

Military women and men may be subject to a wide range of stressors as part of their military work assignments and duties. Such stressors may be associated with the physical or mental challenges of their jobs, demands placed on them because of a shortage of other personnel, exposure to trauma associated with combat, or conflicts between military and family responsibilities. In addition, military women may experience stress associated with being a woman in a predominantly male environment or because of sexual harassment they may encounter. Military personnel are also likely to experience the same stressors as other people outside the Military, including the press of family and work responsibilities, and uncertainties introduced by changing economic conditions.

Psychosocial theories of stress generally recognize the importance of cognitive factors in the development and maintenance of stress-related symptoms and problems in life functioning. Folkman and Lazarus (1980, 1985), for example, proposed a psychosocial model that emphasizes the important role that cognitive appraisal plays in the development and maintenance of stress-related adjustment problems. Indeed, a number of experimental and applied studies have shown robust relationships between individuals' appraisal of the level of stress associated with specific life events, chronic stressors, and their capacity to function effectively (cf., Foa, Steketee, & Olasov Rothbaum, 1989).

Several decades of research also point to the multidimensional nature of reactions to stress, and that such reactions may vary by gender (e.g., Horwitz & Davies, 1994). Numerous studies have reported strong relationships between stress, alcohol consumption, and emotional problems, with particularly robust connections between stressful life events and depression for women (Pianta & Egeland, 1994) and stress and alcohol abuse for men (Bromet, Dew, Parkinson, & Schulberg, 1988; Gorman, 1988; Horwitz & Davies, 1994).

Another characteristic of research to date is that findings on the relationship of stress to substance use and emotional problems vary from study to study. Gorman (1988) noted that certain features of occupational environments serve as stressors that increase risk for alcohol abuse among both men and women. Indeed, a number of studies have found elevated rates of alcohol consumption among those with elevated levels of occupational stress, particularly among men (Horwitz & Davies, 1994). Other studies have found increased rates of cigarette smoking and coffee drinking as a response to high stress, but no relationship between high stress and alcohol consumption (Conway, Vickers, Ward, & Rahe, 1981). Similarly, in some studies of women, alcohol use has not been elevated, but psychotropic medication (e.g., tranquilizers) has been (Brown-Rowat, Amsel, & Jeans, 1990; Frone, Cooper, & Russell, 1994). Further, some studies have found that respondents actually reduced their alcohol use during stressful periods (Breslin, O'Keefe, Burrell, Ratliff-Crain, & Baum, 1995).

Discrepancies between study findings may reflect meaningful differences in research methods, predisposing characteristics of study populations, and the type and severity of the stressor under study. In addition, other factors may influence the relationship between stress and substance abuse, such as

respondents' sociodemographic characteristics and coping styles. For example, research has shown that stressors are highly predictive of drinking problems among men who rely on avoidance coping strategies (Cooper, Russell, Skinner, Frone, & Mudar, 1992). In contrast, women who rely on problem-focused strategies drink less during high-stress weeks than women low on problem-focused coping (Breslin et al., 1995).

Exposure to traumatic stressors has been strongly implicated in the elevated rates of substance abuse and dependence among veterans (McFall, Mackay, & Donovan, 1992), and substance abuse has been found to be highly comorbid with post-traumatic stress disorder (Kulka, Schlenger, Fairbank, Hough, Jordan, Marmar, & Weiss, 1990). Women who served in Vietnam and experienced high levels of war zone stress were found to have significantly higher rates of alcohol abuse and dependence than other women veterans of the Vietnam era, while women theater veterans who were exposed to lower levels of such stress did not have significantly more alcohol disorders than other women veterans of the Vietnam era (Kulka et al., 1990).

Although these studies indicate a relationship between stress and substance use, the extent of the generalizability of their findings to today's active-duty Military is unknown. This chapter builds on these prior studies and extends them by examining the relationship between stress and substance use among military personnel under noncombat, peacetime conditions among the current active force. Whereas most prior studies have focused on alcohol, the present study examines the relationship of stress and heavy drinking, any illicit drug use, and cigarette smoking.

Data for the present study were drawn from the series of Department of Defense (DoD) Surveys of Health Related Behaviors Among Military Personnel conducted in 1980, 1982, 1985, 1988, 1992, and 1995 (Bray et al., 1983, 1986, 1988, 1992, 1995a; Bray, Kroutil, & Marsden, 1995b; Bray, Marsden, Herbold, & Peterson, 1993; Burt, Biegel, Carnes, & Farley, 1980). Trends in substance use are examined across the series of surveys. Findings on stress, coping, and the relationship of substance use and stress draw on the 1995 survey data.

## **Methods**

### **Sampling Design and Data Collection**

The sampling designs and data collection methods have been similar throughout the DoD survey series and are illustrated with the methods used for the 1995 survey. The 1995 sample was selected using a deeply stratified, two-stage, two-phase probability design. The eligible survey population consisted of all active-duty military personnel except recruits, Service academy students, persons absent without official leave (AWOL), and persons who had a permanent change of station (PCS) at the time of data collection. The first stage of sampling involved selection of major military installations stratified by Service (Army, Navy, Marine Corps, Air Force) and world region (within the continental United States [CONUS], and outside CONUS [OCONUS]). Within the selected installations, the second stage of sampling involved selection of military personnel stratified by military pay grade, including three

enlisted pay grade strata (E1-E3, E4-E6, E7-E9) and three officer pay grade strata (warrant officers in grades W1-W5 and commissioned officers in grades O1-O3 and O4-O10). The sample was selected to be representative of the active-duty force worldwide. Officers and women were oversampled because of their smaller numbers.

During data collection, respondents anonymously completed self-administered questionnaires that took about 55 minutes on average to answer. Most respondents (88% in 1995) attended group sessions at 59 installations where questionnaires were administered by civilian data collection teams. Eligible personnel who did not attend group sessions were mailed a questionnaire along with an explanation of the purpose and anonymity of the survey and instructions for completing and returning it.

These procedures produced large sample sizes and respectable response rates for each of the surveys. The sample sizes were 15,268 in 1980, 21,936 in 1982, 17,328 in 1985, 18,673 in 1988, 16,395 in 1992, and 16,193 in 1995. Response rates ranged from 70% to 84%. The survey data were weighted and poststratified to reflect the representation of respondents in the population, and adjustments were made for the potential effects of nonresponse.

### **Description of Measures**

Core sets of comparable items on substance use were used across the survey series. The analyses in this chapter deal with three of these variables: heavy drinking, use of any illicit drug, and any cigarette smoking. Heavy drinking refers to consuming five or more drinks per typical drinking occasion at least once a week during the past 30 days and is based on a drinking-level classification scheme adapted from Mulford and Miller (1960). Any illicit drug use refers to any use during the past 12 months of marijuana or hashish, phencyclidine (PCP), lysergic acid diethylamide (LSD) or other hallucinogens, cocaine, amphetamines or other stimulants, tranquilizers or other depressants, barbiturates or other sedatives, heroin or other opiates, analgesics or other narcotics, inhalants, or "designer drugs." Because of the relatively low prevalence of any illicit drug use during the past 30 days, results are presented for the past 12 months.

Cigarette use was measured in terms of lifetime numbers of cigarettes smoked and the average daily number of cigarettes smoked in the past 30 days. Current smokers were defined as military personnel who reported that they smoked at least 100 cigarettes in their lifetime and who smoked at least once in the 30 days prior to the survey.

Military women and men were asked to appraise the perceived levels of stress that they experienced at work and in their personal relationships and family life. All participants were asked the following two items, and military women were additionally asked the third item:

- During the past 12 months, how much stress did you experience at work or while carrying out your military duties?

- During the past 12 months, how much stress did you experience in your family life or in a relationship with a person you live with or date seriously?
- In the past 12 months, how much stress did you experience as a woman in the Military?

These items on perceived stress were complemented with items about sources of stress and behaviors used to cope with stress. Together, these measures provide the basis for examining relationships between substance use and stress.

### **Analysis Procedures**

Population prevalence estimates and associated standard errors were computed from weighted survey data using the SURvey DATA ANALYSIS (SUDAAN) software package (Shah, Barnwell, & Bieler, 1995). Logistic regressions were also computed using SUDAAN to model outcome measures of heavy drinking, illicit drug use, and cigarette smoking.

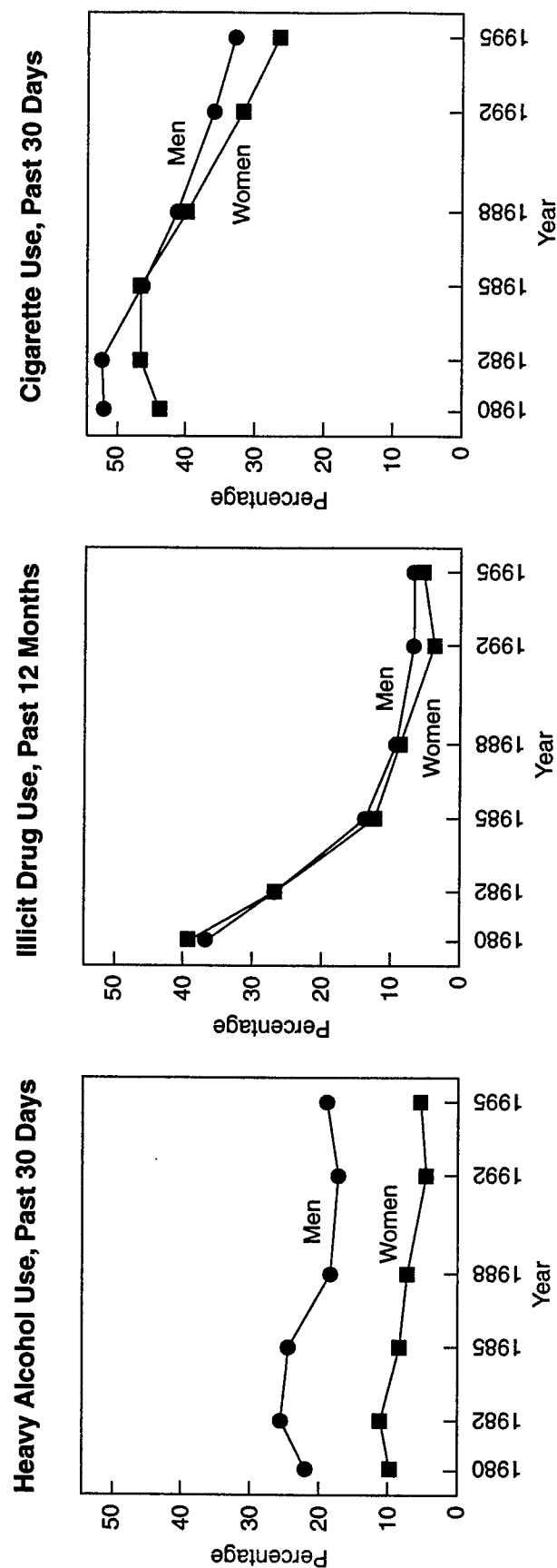
## **Findings**

### **Trends in Substance Use Among Military Women and Men**

Figure 1 presents the trends over the six DoD surveys from 1980 to 1995 of the percentage of active-duty women and men who engaged in heavy alcohol use, any illicit drug use, and any cigarette use. Data on heavy alcohol use and cigarette smoking are presented for the past 30 days prior to the survey period, whereas illicit drug use is assessed for the past year. The past year time period rather than the past month is used for illicit drugs because of the low prevalence of illicit drug use in the later years of the survey series. As shown, heavy alcohol use, illicit drug use, and cigarette use all declined significantly between 1980 and 1995, although the rate of decline varied for each of the substances and between each of the six surveys.

The prevalence of heavy alcohol use during the past 30 days for military women showed an overall significant decline from 9.6% in 1980 to 5.3% in 1995. For military men, the prevalence of heavy drinking dropped slightly, but significantly, from 21.8% in 1980 to 18.8% in 1995. The trend in heavy drinking over the six surveys for women generally showed a gradual decline, although in 1995 it showed a slight upturn. For men, heavy drinking was relatively stable from 1980 to 1985, decreased significantly between 1985 and 1988, and then remained at about the same level between 1988 and 1995. Throughout the survey period, military men consistently showed a higher prevalence of heavy alcohol use than military women; men were two to three times more likely than women to drink heavily. These gender differences in heavy drinking are consistent with patterns of heavy drinking in the civilian sector, with men more likely to drink heavily than women (Substance Abuse and Mental Health Services Administration [SAMHSA], 1995).

Figure 1. Trends in Substance Use Among Military Women and Men



Source: DOD Survey of Health Related Behaviors Among Military Personnel, 1980 to 1995.

The prevalence of any illicit drug use showed a similar pattern for military women and men, with sharp declines from 1980 through 1985, followed by continued but more gradual declines and a tapering off in 1992 and 1995. For military women, illicit drug use during the past 12 months declined sharply from 39.0% in 1980 to 5.3% in 1995; for military men, it dropped from 36.5% in 1980 to 6.7% in 1995. The rate of decrease was much greater than for heavy alcohol use, and the decreases were statistically significant between each of the surveys from 1980 to 1992, but showed no significant change between 1992 and 1995. The similar rates of illicit drug use between military women and men differs from that found in surveys of civilians, which show higher rates of use by men (SAMHSA, 1995).

The percentage of military personnel who smoked cigarettes in the past 30 days also decreased substantially during the 15-year period. Smoking among military women declined from 43.6% in 1980 to 26.3% in 1995; among military men, it declined from 51.7% in 1980 to 32.7% in 1995. The trend for women showed high and relatively level smoking rates between 1980 to 1985, followed by a steep and steady decline through 1995. For military men, smoking rates showed no significant change between 1980 and 1982, but decreased significantly between each of the later surveys. Nonetheless, despite clear progress in reducing the prevalence of smoking, the 1995 rate was considerably higher than the *Healthy People 2000* objective of 20% adopted for the Military (PHS, 1991).

Considered together, the trend data on substance use indicate that all three substances showed statistically significant reductions in use across the period from 1980 to 1995 for both women and men. Despite impressive progress, much remains to be done to combat substance use. Smoking rates still remained high for both women and men; in 1995, roughly one out of four military women and one out of three military men were current smokers. Heavy drinking showed the least change over the years and remained particularly problematic for men. In 1995, about 1 in 5 men but only 1 in 20 women was likely to be a heavy drinker. Drug use showed the most dramatic drop over time. In 1995, illicit drug use was at relatively low levels; about 1 in 20 was likely to use illicit drugs in the past year among men and also among women. Somewhat surprisingly, over the survey period, military women were about as likely as men to use illicit drugs and to smoke cigarettes (although since 1988, smoking among military women declined at a sharper rate than among military men).

Although it is clear that substantial substance use was reported among military personnel, our primary interest here is to examine whether it was related to stress experienced by military women and men. To do that, we examine the types and levels of stress perceived by military personnel, consider the basic methods used to cope with stress, then assess the association between substance use and stress.

### **Appraisal of Stress**

Table 1 shows the levels of perceived stress at work, in the family (or personal relationships), and associated with being a woman in the Military. The distributions across response categories indicate three key findings. The first finding is that both military women and men were more likely to describe their military duties as stressful than their family or personal lives. Among women, nearly 4 out of 10 (40.1%) perceived high levels of stress at work (i.e., a "great deal" or a "fairly large amount") compared

**Table 1. Levels of Perceived Stress Among Military Women and Men**

<b>Type of Stress/ Level of Stress</b>	<b>Women</b>	<b>Men</b>	<b>Total DoD</b>
<b>Stress at Work</b>			
Great deal	17.6	15.7	16.0
Fairly large amount	22.5	23.4	23.3
Some	30.7	29.7	29.8
A little	22.7	20.6	20.9
None	6.5	10.5	10.0
<b>Stress in Family</b>			
Great deal	13.4	8.8	9.3
Fairly large amount	15.9	12.7	13.1
Some	27.3	27.1	27.2
A little	26.9	30.6	30.1
None	16.6	20.8	20.3
<b>Stress Being a Woman in Military</b>			
Great deal	16.2	NA	16.2
Fairly large amount	16.8	NA	16.8
Some	35.4	NA	35.4
A little	18.4	NA	18.4
None	13.2	NA	13.2

Note: Table entries are column percentages of personnel who reported the indicated levels of stress in the past 12 months.

NA = Not applicable.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.



to about 3 out of 10 (29.3%) who experienced high levels of stress in their families or personal relationships. Among men, a comparable 4 out of 10 (39.1%) perceived high stress at work compared to slightly more than 2 out of 10 (21.5%) in their families. In addition, women rated military work somewhat more stressful (40.1%) than being a woman in the Military (33.0%).

The second finding concerns gender differences among women and men in the events that they consider highly stressful. Military women were somewhat more likely to feel high levels of stress in their family or personal relationships (29.3%) than were men (21.5%), but women and men were equally likely to feel high stress in their military work (about 40%). This finding may reflect role differences in family settings in which women assume greater responsibility for child care and household duties and hence may feel more pressures associated with family duties.

The third finding, which applies to women only, is that a third (33.0%) experienced high stress associated with being a woman in the Military. This percentage is slightly higher than the percentage experiencing stress in their family life (29.3%), but smaller than the percentage reporting stress at work (40.1%). Although military women were more likely to experience high stress from military work, a substantial percentage were likely to experience high stress as a result of being a woman in the Military. It is not clear whether this gender-based stress is a result of (a) some features of military life that make it difficult for some women to function, (b) being a woman in a predominantly male organization, (c) poor coping skills among some military women, or (d) some combination of these or other factors.

### **Specific Sources of Stress**

We attempted to enhance our understanding of the nature of perceived stress through the following specific question on potential sources of stress in the domains of work and family life: During the past 12 months, how much stress did you experience from each of the following?

- being deployed at sea or in the field;
- having a PCS;
- problems in your relationships with the people you work with;
- problems in your relationship with your immediate supervisor(s);
- concern about being separated from the Military;
- increases in your workload;
- being away from your family;
- changes in your family, such as the birth of a baby, a divorce, or a death in the family;
- conflicts between your military and family responsibilities;
- problems with money;

- problems with housing;
- health problems that you had;
- and health problems in your family.

Table 2 presents the responses to this question for women and men. It shows that, for women, the most frequently mentioned sources of stress were being away from family (21.1%); major changes in family, such as birth or death of a loved one (17.0%); increases in workload (15.9%); problems in work relationships (15.7%); and problems with supervisors (13.1%). For men, the most frequently mentioned sources of stress were being away from family (23.7%), deployment (17.1%), increases in workload (16.6%), financial problems (15.0%), and conflicts between military and family responsibilities (13.0%).

Overall, the percentages of men and women who identified the different specific problems as significant sources of stress were quite comparable. For example, Table 2 shows that housing problems were a major stressor for 7.6% of men and 7.5% of women, and 15.0% of men and 12.2% of women experienced considerable stress due to financial problems. Some 10.0% of men and 12.2% of women indicated a PCS as a significant stressor, and 8.7% of men and 7.1% of women reported concerns about separation from the Military. Increases in workload were highly stressful for 16.6% of men and for 15.9% of women. Some 13.0% of men and 12.8% of women found conflicts between military and family responsibilities to be a significant source of stress. About one in eight men (12.4%) and women (13.1%) found their relationships with their immediate supervisors to be highly stressful, and problems in relationships with co-workers were highly stressful for 12.4% of men and 15.7% of women.

In spite of an overall trend for similar proportions of men and women to appraise specific circumstances at work and in their personal lives as highly stressful, there nonetheless appeared to be substantial variability by gender for several types of circumstances. Related to their military functioning, more men than women (17.1% vs. 6.9%) perceived deployment at sea or in the field to be a significant stressor. Women were more likely to indicate that major changes in family structure and functioning, such as the birth of a baby, a divorce, or a death in the family (17.0% for women vs. 12.3% for men), were significant stressors. In addition, women were twice as likely as men to indicate that personal health problems (8.6% for women vs. 4.0% for men) were a significant source of stress.

### **Approaches for Coping with Stress**

Coping has been defined in terms of the strategies and processes that individuals use to modify adverse aspects of their environment, as well as to minimize internal distress induced by environmental demands (Lazarus, 1966; Moos & Billings, 1982). An important dimension of coping is the distinction between problem-focused coping strategies, defined as efforts to recognize, modify, or eliminate the

**Table 2. Specific Sources of Stress, Past 12 Months, by Gender, Total DoD**

<b>Stressor</b>	<b>Women</b>	<b>Men</b>	<b>Total DoD</b>
Deployment	6.9	17.1	15.9
Having a PCS <sup>a</sup>	12.2	10.0	10.3
Work relationships	15.7	12.4	12.8
Problems with supervisor	13.1	12.4	12.5
Concern about separation from the Military	7.1	8.7	8.5
Increases in workload	15.9	16.6	16.5
Being away from family	21.1	23.7	23.4
Changes in family	17.0	12.3	12.8
Conflicts between military and family responsibilities	12.8	13.0	13.0
Financial problems	12.2	15.0	14.6
Housing problems	7.5	7.6	7.6
Personal health problems	8.6	4.0	4.6
Family health problems	9.1	7.4	7.6

Note: Table entries are percentages of personnel who reported "a great deal" or a "fairly large amount" of stress in the past 12 months.

<sup>a</sup>PCS = Permanent change of station.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

impact of a stressor, and emotion-focused coping strategies, defined as efforts to regulate negative emotions that occur in reaction to a stressor event (Auerbach, 1989; Lazarus & Folkman, 1984). There is some empirical evidence that problem-focused or approach-oriented coping strategies that attempt to manage the problem are among the more effective ways to deal with stress, although the utility of any approach depends on the demands of the situation and the skill and flexibility of individuals in using various coping strategies.

We asked respondents to identify the types of strategies that they used to cope when they "feel pressured, stressed, depressed, or anxious." The list of response categories included items that tap approach and problem-oriented strategies ("think of plan to solve the problem"); emotion-focused strategies, such as seeking social support ("talk to friend or family member"); and avoidance coping ("have a drink," "smoke marijuana or use other illegal drugs," "think about hurting yourself or killing yourself"). Table 3 shows the percentage of personnel who commonly used specific coping strategies under conditions of stress, by gender for the total DoD.

As shown in Table 3, "think of plan to solve problems" was overwhelmingly indicated by military personnel as a "frequently" or "sometimes" implemented coping strategy (87.3%), followed by "talk to friends/family member" (71.9%) and "exercise or play sports" (63.0%). Across all Services, a solid majority of personnel often used these potentially effective problem-focused and approach-oriented coping strategies to deal with stress, daily pressures, and feelings of depression. With respect to generally less effective avoidant coping strategies, 47.0% indicated that they "get something to eat" when confronted with stress, 23.5% "have a drink," and less than 1% used illegal substances. Just over 4% of military personnel considered hurting themselves or committing suicide as a coping option for stress and/or depressive symptoms.

Table 3 also shows some potentially significant gender differences. Women were more likely to use social support as a coping strategy than were men (87.6% vs. 69.7%, respectively), but were less likely to turn to alcohol as a method of coping (16.8% for women vs. 24.4% for men). Women also reported a greater tendency than men toward using food substances as a method of coping with stress, anxiety, and depression (57.2% vs. 45.5%, respectively).

### **Substance Use and Stress**

There are many strategies for coping with stress, a number of which were examined and discussed above. Data presented in Table 3 suggest that there may be a tendency for some military personnel to use alcohol, illicit drugs, and cigarettes as a coping mechanism for stress. To examine the relationship between substance use and stress in more detail, we conducted a series of logistic regression analyses predicting heavy alcohol use, illicit drug use, and cigarette smoking. Separate analyses were conducted for military women and men for each substance.

For alcohol, the probability of being a heavy drinker was used as the dependent measure. The dichotomous outcome measure was heavy drinking versus other drinking levels (excluding abstainers).

**Table 3. Behaviors for Coping with Stress, by Gender, Total DoD**

<b>Coping Behavior</b>	<b>Women</b>	<b>Men</b>	<b>Total DoD</b>
Talk to friend/family member	87.6	69.7	71.9
Light up a cigarette	24.0	26.7	26.4
Have a drink	16.8	24.4	23.5
Exercise or play sports	60.1	63.4	63.0
Get something to eat	57.2	45.5	47.0
Smoke marijuana/use illegal drugs	0.8	0.8	0.8
Think of plan to solve problem	89.3	87.1	87.3
Consider hurting or killing yourself	3.8	4.2	4.2

Note: Table entries are percentages of personnel who "frequently" or "sometimes" engage in a behavior when they feel pressured, stressed, depressed, or anxious.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

For illicit drug use, the probability of using any illicit drugs during the past 12 months was used as the dependent measure. For cigarette use, the probability of smoking cigarettes in the past 30 days was the dependent measure. Both of the latter two measures were also dichotomous variables, and for all analyses results are expressed as odds ratios.

For these analyses, the measure of interest was the relationship of perceived stress to substance use (i.e., heavy alcohol use, any illicit drug use, cigarette use) after controlling for effects of other sociodemographic factors. Contrasts examined high versus low stress and moderate versus low stress. "High" stress was defined as persons who answered that they had experienced a great deal or fairly large amount of stress in the past 12 months; "moderate" stress was defined as persons who answered that they had experienced some or a little stress in the past 12 months; and "low" stress was defined as those who stated they experienced no stress in the past 12 months. Separate analyses were conducted for measures of stress at work, stress in the family, and stress associated with being a woman in the Military.

Sociodemographic factors included in the models were Service (Army, Navy, Marine Corps, Air Force) race/ethnicity (white, black, Hispanic, other), education (high school or less, some college, college graduate or higher), age (20 or younger, 21 to 25, 26 to 34, 35 or older), family status (not married, married with spouse not present, married with spouse present), pay grade (E1-E3, E4-E6, E7-E9, W1-W5, O1-O3, O4-O10), and duty location (stationed within CONUS or stationed OCONUS).

Table 4 shows the odds ratios for the types of stress (at work, in the family, being a woman in the Military) and levels of stress (high vs. low, moderate vs. low) from the logistic regression analyses for heavy alcohol use, illicit drug use, and cigarette smoking. For military women, results indicate a significant relationship between illicit drug use and cigarette use and stress associated with being a woman in the Military. Those who perceived high stress being a woman in the Military were over 1.5 times more likely than those with low stress to smoke cigarettes in the past 30 days and over 2.5 times more likely to use illicit drugs during the past 12 months. In contrast, military women showed no significant association between levels of stress at work or in the family and substance use.

For military men, results showed significant relationships between levels of stress at work and all three substances and between levels of stress in the family and illicit drug use and cigarette use. More specifically, military men who experienced high stress at work were nearly 1.4 times more likely to drink heavily, over 2.3 times more likely to use illicit drugs and 1.7 times more likely to smoke cigarettes than men with low stress at work. In addition, men who experienced high stress in their families or personal relationships were 1.8 times more likely to use illicit drugs and over 1.5 times more likely to smoke cigarettes than those with low stress.

**Table 4. Perceived Stress and the Odds of Substance Use**

<b>Gender/Stress</b>	<b>Heavy Alcohol Use Past 30 Days</b>	<b>Illicit Drug Use Past 12 Months</b>	<b>Cigarette Use Past 30 Days</b>
<b>Women</b>			
Stress at work			
High vs. low	1.60	1.47	1.20
Moderate vs. low	1.74	.92	.99
Stress in family			
High vs. low	1.28	1.10	.86
Moderate vs. low	1.20	1.44	.86
Stress being a woman in Military			
High vs. low	.97	2.54*	1.52**
Moderate vs. low	.70	1.99	1.29
<b>Men</b>			
Stress at work			
High vs. low	1.37**	2.32***	1.70***
Moderate vs. low	1.01	1.54	1.21*
Stress in family			
High vs. low	1.26	1.81***	1.53***
Moderate vs. low	1.02	1.31*	1.13

Note: Data are odds ratios of substance use adjusted for effects of military Service, race/ethnicity, education, age, family status, pay grade, and duty location. Sample sizes for women ranged from 2,031 to 2,966; for men, sample sizes ranged from 10,403 to 13,171.

\*p<.05

\*\*p<.01

\*\*\*p<.001

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

## Discussion and Recommendations

### Key Findings

Substance use—use of alcohol, illicit drugs, and cigarettes--decreased from 1980 to 1995 among military women and men. Decreases were particularly dramatic for illicit drug use during the past year, and levels of use were similar throughout the time period for women and men. Substantial decreases in cigarette smoking during the past 30 days also were found for military women and men; likewise, levels of use for women and men were similar across the time period. Heavy alcohol use during the past 30 days also decreased for both women and men, but the decrease was more gradual; throughout the period, rates of heavy drinking among men were two to three times those among women. Despite these decreases, rates of heavy alcohol use and smoking remained relatively high. Illicit drug use was less common.

Substance use is often considered to be a means of coping with and reducing stress (McFall et al., 1992), although research shows that the nature of this relationship is more complex than once thought (Brunswick, Lewis, & Messeri, 1992; Martin, Blum, & Roman, 1992). Clearly, as shown here, many military personnel experience high levels of stress associated with military work or family life. Military personnel may be in endangered situations or far away from home and family. They may also experience the same types of stressors in their work and family lives as do nonmilitary personnel. Problems with finances may also contribute to stress. Military personnel reported higher levels of stress associated with their work than with their family life overall. However, separation from family was mentioned most frequently by both women and men as the leading source of high stress. This finding is consistent with the fact that work and family are closely intertwined in the Military. Many military women also reported high levels of stress simply because of their status as women in a predominantly male workforce.

In our regression analyses, the strongest associations between substance use and stress were found for military men. Military men who experienced high levels of stress at work were more likely than those reporting low stress to be heavy alcohol users, illicit drug users, or smokers. Those experiencing high levels of stress in family life were more likely than those reporting low stress to use illicit drugs or to smoke. Among military women, use of alcohol, illicit drugs, and cigarettes were not related to levels of stress at work or in the family. Military women experiencing high levels of stress associated with being a woman in the Military were, on the other hand, significantly more likely than those under low levels of stress to report illicit drug use or cigarette use. Notably, heavy alcohol use among women was unrelated to any type of stress. This finding for military women is consistent with research in general population studies of women that have found little evidence for an association between life events and alcohol consumption (Cook & Allan, 1984).

These findings suggest that military women did not turn to substance use to cope with high or moderate levels of stress in their military work or in their family and personal relationships. However, those who experienced high stress associated with being a woman in the Military were more likely than



those who did not feel such stress to use drugs and to smoke cigarettes. In contrast, men who were experiencing high stress at work and in family life were more likely than those experiencing low stress to be substance users.

The findings from regression analyses are consistent with observations of coping strategies reported by military women and men. Military women reported being less likely than military men to smoke cigarettes or take a drink when they felt stressed. Very few military women or men reported using illicit drugs to cope with stress. Almost 90% of military women and men tried to think of a plan to cope with stress, while military women were much more likely than military men to talk with friends or family members. This is an encouraging finding in that the extant research literature suggests that coping styles aimed at managing problems through direct action of seeking social support are generally more effective than coping strategies that attempt to ignore or avoid the problem (Aldwin, 1993). Military women were less likely than military men to use alcohol or cigarettes in response to stress. Military women were also somewhat more likely than military men to report "getting something to eat" as a coping strategy.

### **Implications**

These findings suggest that stress is an important predictor of substance use among military men but less so among military women. For military women, substance use is primarily associated with stress experienced as a woman in the Military. These findings also suggest the need to target stress reduction and substance use prevention programs differentially for military women and men. Not only do stressors and coping mechanisms differ for women and men, but factors related to substance use may also differ. Because Military women report experiencing work-related stress from being a woman in the military, however, the nature of the work situation for particular occupations should be investigated. Such stress may be related to the fact that women are a minority in a predominantly male workforce or may emerge from other sources within the work group.

These findings also suggest that substance use among military women is associated with factors other than stress, a finding that should guide the development of substance use prevention and education efforts for women. The similarity of rates of illicit drug use and cigarette smoking among military women and men contrasts with the typically higher rates of use among men found in many civilian studies (e.g., SAMHSA, 1995). The substantially higher rates of heavy drinking among military men compared with military women, however, mirrors gender differences found in other studies (Bray et al., 1995b; Bray, Marsden, & Peterson, 1991; Clark & Hilton, 1991; SAMHSA, 1995). Additional analyses should consider the factors related to substance use among military women and the distinctiveness of patterns of substance use among military women relative to military men and civilian women. Prior analyses have suggested that the substance use patterns of military women more closely approximate the substance use patterns of military men than of civilian women (Bray et al., 1991). The determinants of substance use among military women may differ from those found in civilian studies.

## **Recommendations for Further Research**

The current study identifies a number of issues and questions in need of further study to more fully understand the relationship of substance use and stress. More research is needed to understand the nature of stressors military women and men face, the level of those stressors, when and how they relate to substance use, and how they affect work performance. Stress appears to be more strongly related to substance use among military men than military women, although under some conditions stress among military women may also result in substance use. These findings also suggest the need for additional research on the determinants of substance use among military women, their distinctiveness from military men and civilian women, and the nature of stressors in the workplace encountered by military women. Detailed studies of the nature of work groups and occupations engaged in by military women and men, the nature of male and female interactions in the workplace, and specific stressors will inform these questions.

In addition, research should examine the nature of family-related stressors experienced by military personnel and more effective means of addressing these stressors. Research could also examine the relationship between stress and one type of illicit drug use among military women—psychotherapeutic drug use. Although no specific relationship between stress and illicit drug use more generally was found for military women, stress may be related to psychotherapeutic drug use specifically.

This research could be used to inform the design of more effective stress management and substance abuse prevention programs that take into account the specific needs of military women and men. Findings reported here suggest the need to develop different programs for military women and men.

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DRAFT

## **Substance Use Among Military Women and Men, 1980 to 1995**

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### **KEY WORDS:**

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Substance Use Among Military Women and Men, 1980 to 1995

## Substance Use Among Military Women and Men, 1980 to 1995

### Abstract

The percentage of women in the Military is increasing, and there is concern about health risks to women in military service. Although the use of alcohol, illicit drugs, and tobacco has decreased among all military personnel over the past decade, relatively little is known about the prevalence of use among military women. This issue was examined using data from the 1980 to 1995 Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel. Findings showed that illicit drug use decreased dramatically for both military women and men across the period, and rates of use were highly similar for military women and men. Cigarette smoking also decreased, but smoking was higher for military men in some survey years, including the most recent one in 1995. Rates of heavy alcohol use were 2 to 3 times higher among military men than women across the time period, and the sex differential appears to be increasing. Standardized comparisons showed that the declines in illicit drug use and smoking were not attributable to the changing demographic composition of the Military. However, rates of heavy alcohol use would have been greater if the composition of the Military had not changed. Although substance use has decreased among both military women and men, it remains an important health risk for both. Further programmatic attention needs to be directed toward decreasing smoking among military women and men and heavy drinking especially among military men.



## Substance Use Among Military Women and Men, 1980 to 1995

The percentage of women in the Military has increased substantially since the early 1970s, and women now comprise about 14% of active-duty personnel. This increase is associated with the shift from a conscription-based to an all-volunteer force and an increased acceptance of women's involvement in traditionally male-dominated occupations in the Military. As the all-volunteer force was implemented in 1973, the Military began to be faced with a shrinking pool of eligible men interested in joining the Military, and the number of military women began to increase (Hoiberg & White, 1992). By 1990, women were serving in all roles except direct combat and were concentrated in support occupations, some of which were in higher risk settings. In 1990, the Persian Gulf War revealed the potential impact of this expansion of the military involvement of women: the exposure to danger in combat settings and in combat roles (Segal & Hansen, 1992). Noncombat military settings themselves can present exposure to health risks, such as toxic agents. The physical challenges of basic training and the often austere conditions of deployment can create additional health problems (Institute of Medicine [IOM], 1995). Because of the increased involvement of women in the Military and their exposure to a variety of health risks, increased concerns have been voiced about the impact of military service on women's health.

Substance use—the use of alcohol, illicit drugs, and cigarettes—is a major health risk and may be exacerbated by the special conditions of military life, such as work-related stress, isolation, and being away from family and other supports. Substance use has declined among military personnel overall during the past two decades (Bray et al., 1983, 1986, 1988, 1992a, 1995b; Bray, Kroutil, & Marsden, 1995a; Burt et al., 1980), but use remains problematic for the Military. The decline in drug use has been particularly dramatic and is generally attributed to the stringent military policies against drug use, including urine testing of applicants for military service and current military personnel, that have been enacted in a series of directives during the 1980s and 1990s (Department of Defense [DoD], 1980a, 1980b, 1984, 1985a, 1985b, 1986; see also Bray, Marsden, Herbold, & Peterson, 1992b, and Bray et al., 1995a). Although decreases have also been observed in heavy alcohol use and smoking among military personnel, these decreases are not as large as for illicit drug use and have been more recent. Indeed, the Military is recognizing the need for intensified efforts to decrease heavy alcohol use and smoking with further limitations on alcohol and tobacco availability and use.

These trends in substance use for military personnel closely mirror those observed in the civilian population during the 1980s and 1990s: use of illicit drugs has decreased dramatically since a peak in 1979 for most drugs; cigarette smoking has continued to decline; but heavy alcohol use has been more stable (Substance Abuse and Mental Health Services Administration [SAMHSA], 1995). Similarly, use of illicit drugs, alcohol, and cigarettes has decreased among

high school seniors and young adults over the past decade, with a recent increase among high school seniors (Johnston, O'Malley, & Bachman, 1993a, 1993b).

Although there have been notable decreases in substance use among all military personnel, less clear is the extent to which these decreases are found among military women. Because the military population is largely male, changes in substance use for the total military population provide a good indication of the magnitude and direction of changes for military men. However, trends in use among military women may differ—rates of use may be higher or lower than those for military men and may be more stable or volatile. Findings from the young adult civilian population, a population similar in age to that of the military population, indicate that rates of use of illicit drugs, alcohol, and cigarettes decreased for both males and females during the past decade, with a recent upturn in illicit drug use (Johnston et al., 1993a). Rates of use of most illicit drugs remained higher among males than females, but the sex differential may be decreasing. Young adult males were more likely than young adult females to be heavier drinkers, while rates of cigarette smoking were more similar among young adult males and females. Similar downward trends in marijuana use and cigarette smoking were found for women and men aged 18 to 25 in the household population between 1985 and 1993 (SAMHSA, 1995).

This paper examines trends between 1980 and 1995 in illicit drug use, heavy alcohol use, and cigarette smoking among military women and men and the role in those trends of changes in the demographic composition of the Military. Although the substance use patterns of military personnel would be expected to be similar to those of civilians because they are drawn from the civilian population, the substance use rates of military women and men may differ from civilian rates because of such factors as selection, monitoring, and training.

#### Methods

Data for the analyses presented here were drawn from the Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel conducted in 1980, 1982, 1985, 1988, 1992, and 1995 (Bray et al., 1983, 1986, 1988, 1992a, 1995b; Burt et al., 1980). The survey series is sponsored by the DoD and provides comprehensive information about the prevalence and correlates of use of alcohol, illicit drugs, and tobacco and involvement in other health behaviors.

The sampling designs and data collection methods have been similar throughout the survey series and are illustrated with methods used for the 1995 survey. The 1995 sample was selected using a deeply stratified, two-stage, two-phase probability design. The eligible survey population consisted of all active-duty military personnel except recruits, Service academy students, persons absent without official leave (AWOL), and persons who had a permanent change of station (PCS) at the time of data collection. The first stage of sampling involved selection of major military installations stratified by Service (Army, Navy, Marine Corps, Air Force) and world region (within the continental United States [CONUS], and outside CONUS

[OCONUS]). Within the selected installations, the second stage of sampling involved selection of military personnel stratified by military pay grade, including three enlisted pay grade strata (E1-E3, E4-E6, E7-E9) and three officer pay grade strata (warrant officers in grades W1-W5 and commissioned officers in grades O1-O3 and O4-O10). The sample was selected to be representative of the active-duty force worldwide. Officers and women were oversampled because of their smaller numbers.

During data collection, respondents anonymously completed self-administered questionnaires that took about 55 minutes on average to answer. Most respondents (88% in 1995) attended group sessions at 59 installations where questionnaires were administered by civilian data collection teams. Eligible personnel who did not attend group sessions were mailed a questionnaire along with an explanation of the purpose and anonymity of the survey and instructions for completing and returning it.

These procedures produced large sample sizes and respectable response rates for each of the surveys. The sample sizes were 15,268 in 1980, 21,936 in 1982, 17,328 in 1985, 18,673 in 1988, 16,395 in 1992, and 16,193 in 1995. Response rates ranged from 70% to 84%. The survey data were weighted and poststratified to reflect the representation of respondents in the population, and adjustments were made for the potential effects of nonresponse.

Core sets of items on substance use were used across the survey series. In analyses presented here, any illicit drug use refers to any use during the past 30 days of marijuana or hashish, phencyclidine (PCP), lysergic acid diethylamide (LSD) or other hallucinogens, cocaine, amphetamines or other stimulants, tranquilizers or other depressants, barbiturates or other sedatives, heroin or other opiates, analgesics or other narcotics, inhalants, or "designer drugs." Heavy alcohol use refers to consuming five or more drinks per typical drinking occasion at least once a week during the past 30 days and is based on a drinking-level classification scheme adapted from Mulford and Miller (1960). Cigarette use was measured in terms of lifetime numbers of cigarettes smoked and the average number of cigarettes smoked in the past 30 days. Current smokers were defined as those who reported that they smoked at least once in the 30 days prior to the survey.

Population prevalence estimates were computed from weighted survey data using the SURvey DATA ANalysis (SUDAAN) software package (Shah, Barnwell, & Bieler, 1995). T-tests were computed to assess the significance of differences in prevalence rates between military women and men and across survey years.

In this paper, trend data for all military personnel and for military women and men separately were examined for 1980, 1982, 1985, 1988, 1992, and 1995. To control for demographic differences in military populations across survey years, military data for each survey year from 1982 to 1995 were standardized to the military population in 1980 by age (18 to 25, 26 to 55), race/ethnicity (white, black, Hispanic, other), educational attainment (high school graduate or less, more than high school), and marital status (married, not married). The

standardization was accomplished using logistic regression models that were fitted for each measure of substance use (illicit drug use, heavy alcohol use, and cigarette smoking) within each gender. Independent variables for the models were all main effects and two-way interaction terms formed by crossing race/ethnicity, education, marital status, and age (entered as a continuous variable). Models were fitted separately for each survey year. These models were then used to obtain predicted (adjusted) probabilities of substance use for the military population each year based on the demographic distribution of the military population in 1980. These adjusted probabilities can be viewed as the prevalence one would expect if the military population in later survey years had the same race, education, marital status, and age distribution as the military in 1980. The regression-based approach allowed for more variables to be used to control for demographic differences, and logistic models were appropriate because many of the prevalence estimates were small (e.g., less than 20%).

### Results

Trends in illicit drug use, heavy alcohol use, and cigarette smoking between 1980 and 1995 are presented in Figure 1 for all active-duty military personnel, women and men combined. As shown, the percentage of military personnel using any illicit drugs within the past month decreased significantly between 1980 and 1995, from 27.6% to 3.0%. Decreases between each of the survey years from 1980 to 1992 were also significant, and declines were particularly dramatic during the earlier part of the survey period between 1980 and 1985. Heavy alcohol use decreased significantly between 1980 and 1995, from 20.8% to 17.1%. However, heavy alcohol use increased significantly between 1980 and 1982, then showed a decline between each of the subsequent surveys, although only the decreases between 1980 and 1982, 1985 and 1988, and 1992 and 1995 were statistically significant. Cigarette smoking in the past month was stable between 1980 and 1982 at about 51% of the military population, but decreased thereafter to 31.9% in 1995. Decreases between the 1982 and 1985 surveys and each of the later pairs of surveys were statistically significant.

[insert Figure 1 about here]

Figure 2 illustrates the corresponding trends in the use of illicit drugs, heavy alcohol use, and cigarette smoking for military women and men separately. Steady declines in use of illicit drugs in the past month were found for both military women and men between 1980 and 1995, and the rates of use for military women and men were highly similar. The percentage of military women using illicit drugs within the past month decreased from 26.4% to 2.6%, while the percentage of users among military men decreased from 27.6% to 3.1%. The percentage of drug users was slightly higher for males than females in 1980, 1985, 1992, and 1995 but slightly higher for females in 1982 and 1988. None of these differences between military women and men was statistically significant.

[insert Figure 2 about here]

This close correspondence of rates of illicit drug use for military women and men contradicts a body of epidemiologic research on substance use—largely based on civilian populations—that has found higher rates of illicit drug use among men than women. In 1993, for example, 7.4% of males in the U.S. household population aged 12 or older compared with 4.1% of females reported drug use in the past month. Comparable figures for young adults aged 18 to 25 were 18.9% for men and 8.1% for women (SAMHSA, 1995). Standardized comparisons of rates of substance use among military personnel and civilians in 1985 found that rates of drug use among military women were closer to those of military men than civilian women, while among civilians, drug use was substantially lower among women than men. Rates of use among military women and men were lower than among civilian women or men (Bray, Marsden, & Peterson, 1991). Thus, military women may differ from civilian women in their drug use behavior; their drug use was lower than among civilian women and may more closely resemble that of military men.

Rates of heavy drinking among military women and men decreased between 1980 and 1995, and the rates were highly dissimilar, consistent with other epidemiologic studies (e.g., SAMHSA, 1995). As shown in Figure 2, the percentage of males who were heavy drinkers decreased from 21.8% in 1980 to 18.8% in 1995, while the percentage among females decreased from 9.6% to 5.3%. Rates of use for both women and men increased slightly between 1992 and 1995. Rates of heavy alcohol use among military men were generally 2 to 3 times those among military women in each of the survey years, and rates of use between military women and men were significantly different in each survey year. In 1980, the ratio between men and women who drank heavily was 3.5, indicating an increasing divergence in patterns of alcohol use.

Rates of cigarette smoking in the past month among military women and men also decreased between 1980 and 1995. The rates for military men were significantly greater than those for military women in 1980, 1982, 1992, and 1995. These downward trends mirror those found in other epidemiologic studies of smoking (e.g., SAMHSA, 1995).

Although the use of illicit drugs, heavy alcohol use, and cigarette smoking decreased among military women and men between 1980 and 1995, part of the decline may be due to the changing demographic composition of the Military. Not only has the percentage of women in the Military increased, from about 4% in 1980 to 14% in 1995, but the character of the military population has also changed. The Military has become better educated, older, and more likely to be married—characteristics all associated with lower rates of substance use. As shown in Table 1, which provides estimates of the demographic composition of the military population derived from the Worldwide Survey series, the percentage of the military population over age 25 increased substantially from 1980 to 1995. For males, this "older" population increased from about 45% to 57%; for females, the increase was from 26% to 52%. The percentage of whites decreased slightly for males, from 71% to 69%, but more notably for females, from 72% to 60%. Similarly, the percentage with at least some college and the percentage married increased

substantially. These changes in the composition of the military population are the result of recruiting changes that have placed more emphasis on a better educated, more prepared military workforce.

[insert Table 1 about here]

To examine the impact of a changing demographic structure on substance use among military women and men, rates of use in 1982 and later years were adjusted separately for women and men to the 1980 female and male military population. Adjustments were made for race/ethnicity, marital status, education, and age in regression-based standardization procedures discussed earlier. Unadjusted and adjusted rates of illicit drug use, heavy alcohol use, and smoking are presented in Table 2.

[insert Table 2 about here]

As shown in Table 2, looking first at unadjusted rates, all of the observed decreases in illicit drug use, heavy alcohol use, and cigarette smoking among males were statistically significant for the total period between 1980 and 1995, and most changes were significant between each of the survey years as well. Fewer differences in unadjusted rates between the survey years were significant for females than for males, although decreases in all three substances were significant for females across the total survey period. Most of these significant differences in unadjusted rates were also seen for adjusted rates. Thus, controlling for changes in the demographic composition of the Military does not substantially alter observed findings of significant decreases in use of alcohol, drugs, and cigarettes between 1980 and 1995. This suggests that the changes in substance use between 1980 and 1995 were not strongly related to changes in the demographic composition of the Military. One exception was changes in heavy alcohol use between 1980 and 1995 for both males and females; unadjusted rates were significantly different while adjusted rates were not. Thus, rates of heavy alcohol use would have been higher if the 1980 demographic composition of the Military had remained the same through 1995.

#### Discussion

Substance use—use of illicit drugs, heavy alcohol use, and cigarette smoking—decreased among both military women and men between 1980 and 1995. Rates of use in 1995 for illicit drug use and smoking were the lowest for military women and men since the survey series began, although slight increases in heavy alcohol use were found between 1992 and 1995. However, trends in use for the three substances differed for comparisons of women and men: (a) Military women and men were about equally likely to use illicit drugs across the survey series; (b) cigarette smoking was somewhat higher among men in some survey years; and (c) military men were substantially more likely than military women to be heavy drinkers across the time period. These findings show an overall downward trend in use among military personnel between 1980 and 1995. Sex differentials in use between women and men were similar to those found for civilian populations except for the close correspondence of rates of

illicit drug use among military women and men. Rates of illicit drug use among military women and men, however, both decreased to rates considerably lower than among civilians.

Although the composition of the military population changed over the past two decades to an older, more married, better educated population, the changing demographic composition of the Military was not the primary reason for the observed decreases in illicit drug use and smoking. Instead, the decreases in use among military women and men were likely a reflection of broader decreases in substance use in the civilian population and the result of military policy directed toward decreasing substance use. The decreases were particularly dramatic for illicit drug use.

Changes in demographics among military women and men were related to declines in rates of heavy drinking. Adjusted rates suggested that military programs and policies have had little effect on rates of heavy drinking; rather, observed declines in unadjusted rates are largely due to the changes in risk factors among the population. Despite the progress that has been made in reducing substance abuse among military women and men, further programmatic attention needs to be directed toward decreasing smoking and heavy drinking. As of 1995, more than one-fourth of military women and men smoked, and one in six military men drank heavily. Fewer than 4% of military women and men were illicit drug users.

The close correspondence of rates of illicit drug use and, to a somewhat lesser degree, of cigarette smoking among military women and men suggests that military women are exposed to the health risks associated with substance use almost to the same degree as military men. However, further investigation is needed of the impact of substance use on the health of military women and the relation between substance use among women and special military conditions, such as deployment and high-risk occupations and settings. As the percentage of women in the military increases and their occupations expand, these issues become more critical. Although substance use decreased among military women and men in recent years, it remains a significant health problem for both.

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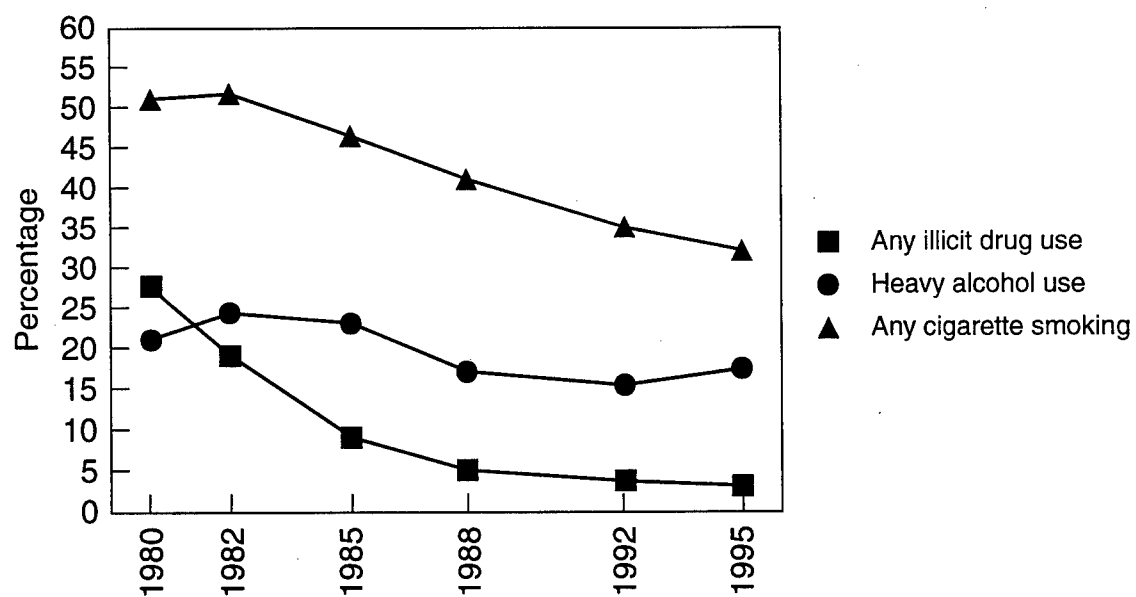
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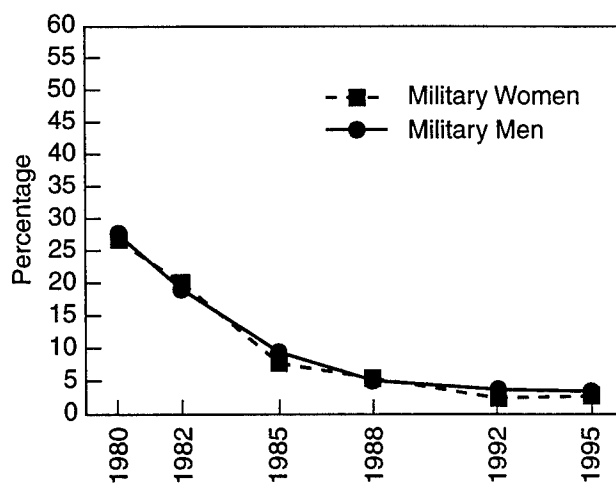
### Figure Captions

- Figure 1. Trends in past month illicit drug use, heavy alcohol use, and cigarette smoking between 1980 and 1995, DoD.
- Figure 2. Trends among military women and men in past month substance use between 1980 and 1995, DoD.

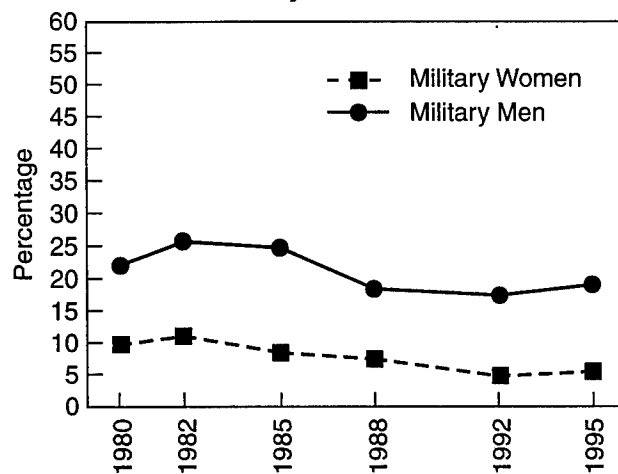


Source: DoD Surveys of Substance Use and Health Behaviors Among Military Personnel, 1980 to 1995.

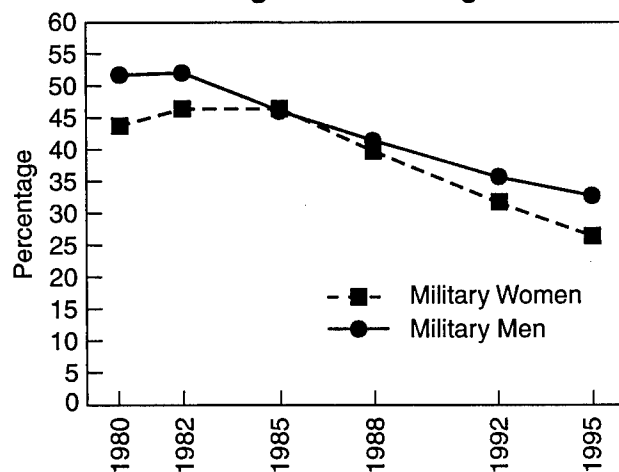
### Any Illicit Drug Use



### Heavy Alcohol Use



### Cigarette Smoking



Source: DoD Surveys of Substance Use and Health Behaviors Among Military Personnel, 1980 to 1995.

**Table 1. Sociodemographic Characteristics of Military Women and Men**

Characteristic	Year/Gender									
	1980		1982		1985		1988		1992	
	Women n=1,359	Men n=13,731	Women n=2,191	Men n=19,745	Women n=1,324	Men n=16,004	Women n=1,747	Men n=16,926	Women n=1,948	Men n=14,447
<b>Age</b>										
20 and younger	29.4	20.6	23.9	22.8	14.3	17.5	15.0	13.6	14.0	9.2
21-25	44.3	34.3	44.6	34.6	42.4	34.7	32.4	30.1	33.4	28.5
26-34	23.1	28.3	28.6	27.8	36.8	29.7	41.3	33.6	36.4	37.4
35 and older	3.2	16.8	2.8	14.7	6.5	18.0	11.3	22.7	16.3	24.9
<b>Race/Ethnicity</b>										
White	72.0	70.8	64.4	71.9	68.6	72.6	60.0	70.6	58.9	68.3
Black	19.5	18.6	23.1	16.0	23.1	16.3	27.3	17.3	29.4	18.3
Hispanic	3.6	4.7	7.9	6.8	4.1	7.0	8.5	8.0	6.3	8.4
Other	5.0	5.8	4.6	5.2	4.1	4.1	4.2	4.1	5.5	5.1
<b>Education</b>										
High school or less	48.9	54.4	45.3	51.7	41.6	49.6	37.9	43.5	35.9	39.5
Some college	35.3	29.9	38.6	33.1	41.0	34.1	41.2	37.3	46.3	41.1
College	15.7	15.7	16.0	15.2	17.4	16.3	20.9	19.2	17.8	19.4
<b>Marital Status</b>										
Married	35.4	54.5	43.0	52.0	46.4	56.9	47.3	62.2	51.0	64.6
Not married	64.6	45.5	57.0	48.0	53.6	43.1	52.6	37.8	49.0	35.4

Note: Estimates are column percentages.

Source: DoD Surveys of Substance Use and Health Behaviors Among Military Personnel, 1980 to 1995.

**Table 2. Trends in Substance Use, Past 30 Days, Unadjusted and Adjusted by Sociodemographic Characteristics**

Sociodemographic Characteristics						
Measure/Type of Estimate	Year					
	1980	1982	1985	1988	1992	1995
Women						
Any illicit drug use	26.4	19.8 <sup>a</sup>	7.6 <sup>a</sup>	5.2	2.1 <sup>a</sup>	2.6 <sup>b</sup>
	26.4	20.8 <sup>a</sup>	9.8 <sup>a</sup>	5.6 <sup>a</sup>	2.3 <sup>a</sup>	3.6 <sup>b</sup>
Heavy alcohol use	9.6	11.0	8.3	7.1	4.4	5.3 <sup>b</sup>
	9.6	11.9	9.6	9.3	6.4	7.3
Any cigarette smoking	43.6	46.2	46.2	39.7 <sup>a</sup>	31.5 <sup>a</sup>	26.3 <sup>a,b</sup>
	43.6	47.7	47.3	42.7	34.7 <sup>a</sup>	30.7 <sup>b</sup>
Men						
Any illicit drug use	27.7	18.9 <sup>a</sup>	9.1 <sup>a</sup>	4.8 <sup>a</sup>	3.6 <sup>a</sup>	3.1 <sup>b</sup>
	27.7	18.1 <sup>a</sup>	9.5 <sup>a</sup>	5.7 <sup>a</sup>	4.8	3.7 <sup>b</sup>
Heavy alcohol use	21.8	25.4 <sup>a</sup>	24.4	18.3 <sup>a</sup>	17.1	18.8 <sup>b</sup>
	21.8	24.8 <sup>a</sup>	25.0	20.7 <sup>a</sup>	21.3	22.2
Any cigarette smoking	51.7	51.9	46.0 <sup>a</sup>	41.1 <sup>a</sup>	35.7 <sup>a</sup>	32.7 <sup>a,b</sup>
	51.7	52.5	46.2 <sup>a</sup>	42.5 <sup>a</sup>	38.1 <sup>a</sup>	35.5 <sup>a,b</sup>

Note: Estimates are percentages. Significance tests were done between consecutive survey years and between 1980 and 1995. See Table 1 for sample sizes for women and men for the respective survey years.

<sup>a</sup>Comparison between this survey and the preceding survey was statistically significant at the 95% confidence level.

<sup>b</sup>Comparisons between 1980 and 1995 are statistically significant at the 95% confidence level.

<sup>c</sup>Adjusted estimates have been standardized to the 1980 distribution by age, education, race/ethnicity, and marital status.

Source: DoD Surveys of Substance Use and Health Behaviors Among Military Personnel, 1980 to 1995.

# **The Effects of Stress and Coping Style on Health Risk Behaviors and Functioning in Military Women**

DRAFT

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# **The Effects of Stress and Coping Style on Health Risk Behaviors and Functioning in Military Women**

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## **Abstract**

Military women are exposed to a wide range of stressors as a part of military work assignments, and they may also experience stressors unique to being a woman in a predominantly male work environment. Little is known, however, about the relationship of stress and coping styles on adverse health outcomes in women and the characteristics of women who are most at risk of stress-related problems. In this paper, the authors divided stressors into five independent types: work-related stress, family-related stress, financial stress, health-related stress, and perpetration of violence. For each of these, the authors examined how coping styles mediate the effects of these stressors on impaired work performance, symptoms of depression, and substance use problems (heavier drinking, heavy smoking, and illicit drug use) in military women. Stressors were highly predictive of a range of adverse psychosocial and functional outcomes. Demographic predictors varied by type of outcome; however, some trends were apparent in the substance use measures: Women who were unmarried, and who had a high school education or less, appear to be more at risk of substance use problem behaviors. Coping style appeared to interact with some stressors in affecting certain psychosocial and functional outcomes; however, the relationship between stressors and adverse health outcomes is not always mediated by a positive coping style.



Review of recent literature reveals a growing interest in observing the effects of stress on psychosocial and functional outcomes, such as substance abuse problems, depression, and decreased capacity to function effectively in the workplace. However, the literature on stress and coping has only rarely focused on gender differences. Although the existing data are inconsistent, there is evidence suggesting that the relationship between stress and these outcomes is different for women than for men. A high exposure to stress, for military women, makes this population a good one for research focusing on the effects of stress on health problems in women. Military women are exposed to a wide range of stressors as a part of military work assignments and may also experience stressors unique to being a woman in a predominantly male work environment.

The interest and concern regarding the effects of stress on psychosocial and functional outcomes was reflected in the 1995 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel. This survey incorporated, for the first time in the Department of Defense's (DoD's) series of surveys on the health of military personnel, many items related to stress, coping strategies, and their effects on a range of adverse health outcomes. This paper examines these measures in order to (a) examine the effects of stressor types and coping style on substance use problems, impaired work performance, and symptoms of depression in military women; and (b) identify demographic and behavioral characteristics of military women at risk of stress-related problems.

To inform our approach to this analysis, we used theories of stress and coping. Research in the last two decades has pointed to three distinct elements of the stress and coping process: (a) the type of stressor or environmental demand; (b) psychosocial mediators, such as an individual's appraisal of the stressor (i.e., the meanings people attach to life events and chronic stressors), and coping style; and (c) the resulting psychosocial, physiological, and behavioral outcomes. Lazarus and Folkman (1984) defined coping as behaviors and cognitions that individuals use to manage a stressful situation and the negative emotions associated with the situation. An important element of coping is how individuals appraise a stressful situation and their resources to cope with the problem (whether they be material goods, psychological resources or social support) (Hobfoll, 1989, in Aldwin, 1993). The relationship between stress and adverse health outcomes is believed to be moderated by the type of stressor and by individuals' appraisal of the degree of stress associated with life events and chronic stressors. Stressful appraisals include whether the stressful situation involves threat, harm, and/or loss, and they are a function of both the person (beliefs, values, commitments, and personal preferences) and the nature of the situation (Aldwin, 1993).

Coping is thought to be an important mediator of the relationship between stress and adverse health outcomes. In the literature on coping, a key controversy is whether to assess coping styles or coping strategies. Coping styles are thought to be relatively stable characteristics and are divided into two basic types—approach and avoidance. Roth and Cohen (1986) characterized that approach style as one that incorporates attempts to manage the problem (or "problem-focused coping"), that is, doing something to remove the source of stress. An avoidant style is one in which the individual ignores the problem yet does something to reduce negative affect (or "emotion-focused coping"). In general, problem-focused coping is associated with better health outcomes. A divergent focus in the research has been on coping as a process, rather than as a trait or style. Folkman and Lazarus (1985) demonstrated that individuals may have a general inclination toward emotion versus problem-focused coping; however, different coping strategies may be employed by the same individual in response to different stressors and may also change over time. Folkman (1993), Folkman and Lazarus (1985) and others (e.g., Mattlin et al., 1990) have shown that the efficacy of avoidant/approach strategies varies as a function of the type of stressor.

This study did not include an in-depth analysis of coping strategies or processes, but it did assess the mediating effect of coping style on the relationship between an extensive and diverse range of stressor types and outcomes. Items from several different indexes of coping responses were used to construct a general indicator of coping style. This was to examine the potential role of coping style in mediating the relationship between stressor types and the range of psychosocial and functional outcomes.

## **Methods**

### **Sampling Design and Data Collection**

The 1995 DoD survey sample was selected using a stratified, two-stage, two-phase probability sample. The eligible survey population consisted of all active-duty personnel, excluding recruits, Service academy students, persons absent without official leave (AWOL), and persons who had a permanent change of station (PCS) at the time of data collection. The first stage of sampling involved selection of military installations stratified by branch of Service (Army, Navy, Marine Corps, and Air Force) and world region (within the continental United States [CONUS], and outside CONUS [OCONUS]). Within the selected installations, the second stage of sampling involved selection of military personnel stratified by pay grade, including three enlisted pay grade strata and three officer pay grade strata. The sample was selected to be representative of the active-duty force worldwide. Women and officers were oversampled because of their

smaller numbers. This analysis was conducted on the subsample of military women ( $N=2,974$ ), who comprised 18.4% of the total sample ( $N=16,193$ ).

The majority of the data were collected between April and August 1995 using self-administered questionnaires completed anonymously by respondents. The questionnaire averaged about 55 minutes to complete. Most respondents attended group sessions at 59 installations, where questionnaires were administered by civilian data collection teams. Eligible personnel who were not able to attend group sessions were mailed a questionnaire along with an explanation of the purpose and anonymity of the survey, as well as instructions for completing and returning it; these additional data were received also in 1995. The overall response rate among eligible survey participants was 69.6%. The data were weighted and post-stratified to reflect the representation of the population, and adjustments were made to offset the potential effects of nonresponse.

### **Description of Measures**

The analyses in this study examined the effects of stressor types and coping style on substance use problems, impaired work performance, and symptoms of depression in military women. The analyses also identified the demographic and behavioral characteristics of military women at risk of stress-related problems. We tested the following hypotheses: Women who experience significant stress, and rely on avoidant coping strategies, are more likely to engage in health risk behaviors, such as heavy drinking; more likely to report depressive symptoms; and more likely to have problems functioning on the job. Enlisted women, and women of lower socioeconomic status as measured by race, and educational and pay levels, are more likely to report experiencing significant stress.

### **Dependent Measures**

Dichotomous dependent measures were constructed from related categorical variables. These outcomes of interest were operationalized as follows:

**Impaired Work Performance:** On 7 or more work days in the past 12 months, the respondent

- was late for work by 30 minutes or more
- left work early for a reason other than errand holiday
- was hurt in an on-the-job accident
- worked below normal level or performance, or
- did not come to work at all because of illness or personal accident.

**Depression:** In the past 12 months, the respondent

- had 2 weeks or more in which she “felt sad, blue, or depressed”
- felt sad or depressed much of the time.

**Heavier Drinking:** The respondent reported that she drank 2 to 4 drinks per typical drinking occasion at least once a week, or 5 or more drinks per typical drinking occasion 2 to 3 times per month; **OR** drank 5 or more drinks per typical drinking occasion at least once a week.

**Illicit Drug Use:** The respondent reported any use in the past 12 months of marijuana, PCP, LSD, cocaine, amphetamines, tranquilizers, barbiturates, heroin, analgesics, inhalants, or “designer drugs.”

**Heavy Cigarette Use:** In the past 30 days, the respondent smoked one or more packs of cigarettes per day on a typical day.

### **Independent Measures**

The key predictors were stressor types and coping style, in addition to sociodemographic characteristics. Stressors were divided into five independent measures: work-related stress, family-related stress, financial stress, and health-related stress, and perpetration of violence. These were operationalized as follows:

- At least once in the past 12 months, the respondent experienced “a fairly large amount” or “a great deal” of stress from:

**Work-Related Stress:** Being deployed at sea or in the field, having a permanent change of station, problems in relationships with supervisor or co-workers, concern about being separated from the Military, *or* increases in workload.

**Family-Related Stress:** Being away from family, *or* changes in the family, such as birth of a baby, a divorce, or a death in family.

**Financial Stress:** Problems with money *or* problems with housing.

**Health-Related Stress:** Health problems in respondent *or* in family.

- **Perpetration of Violence:** At least once in past 12 months, the respondent got in a fight where she hit someone other than a family member, *or* hit her spouse or date, *or* hit her child(ren) for a reason other than discipline (spanking).

We developed a variable representing two coping styles: a positive, action-oriented coping style, and a negative coping style, to examine whether or how coping style mediates the stress-outcome relationship. To develop the coping measure, we conducted a Principal Factor Analysis with Varimax Rotation (Keppel & Zedeck, 1989) to identify underlying factors associated with the two coping styles. Eight variables drawn from coping indexes loaded heavily (factor loadings ranged from .45 to .68) into two emerging factors consistent with an "avoidant" coping style or a "problem-focused" style. The finding matched the theoretical groundwork characterizing the two general coping styles, which were operationalized, in one dichotomous variable, as follows:

**Positive, Action-Oriented Coping Style:** When feeling "pressured, stressed, depressed, or anxious," the respondent *frequently* (rather than sometimes, rarely, or never)

- talks to a friend or family member
- exercises or plays sports, or
- thinks of a plan to solve the problem.

**Negative Coping Style:** The respondent reports non-frequent positive coping. This includes the report of cigarette, alcohol or marijuana use, getting something to eat, or thinking about hurting or killing self when feeling pressured, stressed, depressed or anxious.

### **Analysis Procedures**

Population prevalence estimates and associated standard errors were computed from weighted survey data using the SURvey DATA ANalysis (SUDAAN) software package (Shah, Barnwell, & Bieler, 1995). Logistic regression analyses were computed using SUDAAN and SAS to model the outcome measures of depression, impaired work performance, heavier drinking, heavy smoking, and illicit drug use.

## **Results**

### **Demographic Characteristics**

Table 1 displays a summary of the demographic characteristics of the sample. The majority of respondents were young (approximately 77% under age 35), white (67.7%), and enlisted rather than officer (84.4%), effectively representing the composition of the population of women in the total force. A slight majority were currently married (53.2%), and a large majority were moderately educated (approximately 80% had less than 4 years of college). By virtue of these demographic characteristics, the sample represents a cross-section of women who would be expected to report higher levels of

overall alcohol consumption, tobacco use, or illicit drug use, than women in the general population.

[Insert Table 1 about here]

### **Appraisal of Stress Among Women in the Military**

Table 2 shows the type and level of stress reported by both women and men in the total sample. As reported previously (Bray, Fairbank, & Marsden, 1996), both military women and men reported high stress in their military work (about 40%). However, military women (29.3%) were more likely than men (21.5%) to describe their family or personal lives as stressful. This finding may reflect role differences in family settings in which women assume a disproportionate responsibility for childcare or household duties, perhaps leading to role overload or role conflict for women balancing a career in the Military with lives at home. The finding may also be related to the stress of being away from family members due to deployment or duty assignments, or experiencing changes such as separation, divorce, or other problems in the family. However, women were somewhat more likely to report stress due to being a woman in the Military than stress due to family problems: some 33% reported “a fairly large amount” or “a great deal” of stress from being a woman in the Military.

[Insert Table 2 about here]

### **Stress-Related Factors Associated with Psychosocial and Functional Outcomes**

Although some 40% of military women perceived a great deal or fairly large amount of stress at work, and nearly 30% perceived that equivalent degree of stress in the family, additional univariate analyses revealed significant levels of stress in military women engendered from problems with health, finances, and being involved in perpetration of violence toward a spouse or child(ren). Further analyses permitted an in-depth view of the effects of these sources of stress, testing the associations of specific types of work, family, and other stressors on several health outcomes in military women.

The remaining five tables display the findings from multivariate logistical regression models testing the associations of stress-related factors with five negative psychosocial and functional outcomes in military women: impaired work performance, depression, heavier drinking, illicit drug use, and heavy smoking. In each model, the dependent variables were dictotomous. Independent measures included five dichotomous stress types: work-related stress, family-related stress, financial stress, health-related stress, and perpetration of violence, and these were included in each model. In addition, all of the

models except the one examining depression as an outcome included depression as a predictor variable. The models examining the outcomes of depression, impaired work performance, and smoking included heavier drinking as an independent measure. The models examining heavier drinking and illicit drug use included heavy smoking as a predictor. Each model tested the independent effect of coping style on health outcomes and also the interaction of coping style with each of the five stress types on health outcomes. Only the interaction terms that are statistically significant are included in the tables. Each model also included an examination of the associations of six demographic variables with the outcomes of interest; these independent variables included enlisted versus officer status, education level, marital status, branch of Service, race, and age.

### **Associations with Depression**

As shown in Table 3, experiencing significant work-related stress increased the relative odds of symptoms of depression for military women. Those who reported a fairly large amount or a great deal of stress at work were more than two and one-half times more likely than those reporting low stress to report symptoms of depression in the past year [OR 2.6; 95% CI (2.0, 3.3)]. Family-related stress was also strongly associated with feeling symptoms of depression among women; those who experienced stress in their home lives were more than twice as likely to have been depressed [OR 2.3; 95% CI (1.6, 2.8)]. Financial and health-related stress were also significant predictors of depression, as was being a perpetrator of violence. A negative coping style was not significantly associated with depression [OR 1.6; 95% CI (0.9, 1.8)]; however, experiencing significant health-related stress and having a negative coping style increased the relative odds of depression nearly fivefold [OR 4.7, 95% CI (1.3, 16.6)] for military women. Of the demographic factors examined, only marital status appeared to influence the report of depression: Women who were married were about 40% less likely than unmarried women to report depression [OR 0.6; 95% CI (0.5, 0.8)].

[Insert Table 3 about here]

### **Associations with Impaired Work Performance**

Table 4 shows the predictors of impaired work performance in military women. Not surprisingly, work-related stress and impaired work performance were highly associated: Experiencing a great deal of stress at work almost doubled the relative odds of impaired work performance (including being frequently late or absent, being injured on the job, and working below performance) [OR 1.9; 95% CI (1.3, 2.6)]. Depression was an equally strong predictor of impaired work performance. Women who experienced symptoms of depression were twice as likely as those who were not depressed to report

impaired performance at work [OR 2.0; 95% CI (1.5, 2.7)]. Health-related stress was also highly associated with impaired work performance in military women, with stress due to health problems increasing the relative odds of impaired work performance by about 70% [OR 1.7; 95% CI (1.2, 2.3)]. The effects of health-related stress on impaired performance was not mediated by coping style, suggesting that the presence of health problems may directly influence problems with performance of duties at work. There appear to be no significant associations between demographic characteristics, such as age or education level, and impaired work performance.

[Insert Table 4 about here]

### **Associations with Heavier Drinking**

In contrast, many demographic characteristics were significantly associated with heavier alcohol use; heavy cigarette use was strongly associated with heavier drinking as well. As shown in Table 5, those who were white were twice as likely as blacks and non-Hispanic others to drink more heavily [OR 2.1; 95% CI 1.2, 3.8)]. Being a heavy smoker more than doubled the relative odds of heavier drinking [OR 2.1; 95% CI 1.5, 3.0)]. Women who were enlisted [OR 0.6, 95% CI 0.4, 0.9)] and who were married [OR 0.6, 95% CI 0.5, 0.8)] were less likely to drink more heavily, while those in their 20s and who were college graduates were more likely to drink heavily than those in the comparison groups (see Table 5). Financial stress and being a perpetrator of violence also emerged as factors significantly associated with heavier drinking: experiencing financial stress increased the relative odds of heavier drinking by 60% [OR 1.6; 95% CI (1.2, 2.1)], and perpetration of violence increased those odds by 80% [OR 1.8; 95% CI (1.2, 2.9)]. Coping style did not appear to mediate the relationship between these stressors and heavier drinking.

[Insert Table 5 about here]

### **Associations with Illicit Drug Use**

The findings regarding key predictors of illicit drug use were similar to those related to heavier drinking, revealing significant associations among the same demographic factors and stressor types. Financial stress, unmediated by coping style, increased the relative odds of illicit drug use [OR 1.8; 95% CI (1.0, 3.1)], as did being a perpetrator of violence [OR 2.2, 95% CI (1.3, 3.7)]. Not surprisingly, being a heavy smoker was strongly associated with the use of illicit drugs in the past year [OR 3.0; 95% CI 1.9, 4.7)], perhaps reflecting the prevalence of cigarette use among marijuana smokers. Although there were significant variations in the use of illicit drugs by branch of Service, with



women in the Air Force relatively the least likely and those in the Navy the most likely to report illicit drug use, findings should be viewed with caution, because such untested factors as recruitment policies may influence the apparent differences in reported drug use among the Services. Among demographic predictors, age emerged as a singular factor associated with drug use, with younger women more than twice as likely as older women to report illicit drug use: Those who were under 21 [OR 2.3; 95% CI (1.1, 4.6)] and 21 to 25 [OR 2.2, 95% CI (1.2, 3.8)] were significantly more likely than those over 25 to report use of illicit drugs.

[Insert Table 6 about here]

### **Associations with Heavy Smoking**

Table 7 shows the predictors of heavy smoking. In contrast to the findings related to illicit drug use, coping style appeared to strongly mediate the effects of work-related stress on heavy smoking: Those who experienced work-related stress and had a negative coping style were more than four times more likely than those with low stress and a positive coping style to be a heavy smoker [OR 4.1; 95% CI (1.6, 11.0)]. Experiencing financial stress increased the relative odds of being a smoker by 80% [OR 1.8; 95% CI (1.2, 2.7)], and as would be expected, those who were heavier drinkers were more likely than non-smokers to be heavy smokers as well [OR 2.1; 95% CI (1.5, 3.0)]. Several demographic factors were independently associated with heavy smoking: Women with less than a college education, who were white, and age 35 or older were more likely than more educated, minority, and younger women to be heavy smokers (see Table 7).

[Insert Table 7 about here]

### **Discussion**

The authors hypothesized that women who experience significant stress, and rely on avoidant coping strategies, are more likely to engage in health risk behaviors, such as heavier drinking, smoking, and illicit drug use; more likely to report depressive symptoms; and more likely to have problems functioning on the job. The authors expected that enlisted women, and women of lower socioeconomic status as measured by race and educational and pay levels, would be at greater risk than higher status women for stress-related health problems.

Data yielded from logistic regression analyses showed that, indeed, several stressor types were highly predictive of a range of adverse psychosocial and functional outcomes,

including depression, impaired work performance, and heavy and illicit substance use. Examination of specific stressor types provided valuable insights into how differences in the type of stressor or environmental demand may affect health outcomes.

An examination of the effects of stress in each of the models revealed an interesting pattern in the clustering of dependent measures. Experiencing work-related stress and health-related stress increased the likelihood of depression and impaired work performance. On the other hand, experiencing financial stress and being a perpetrator of violence appeared to influence outcomes related to substance use or abuse. Several demographic factors were also strongly associated with substance-use-related outcomes. Findings related to heavier drinking, illicit drug use, and smoking suggested that not just stress itself, but a complex array of predispositional factors may influence these outcomes.

Coping style appeared to interact with some stressors in affecting certain psychosocial and functional outcomes, and it was independently associated with depression and heavy smoking. Specifically, coping style strongly mediated the associations of health-related stress with depression and work-related stress with heavy smoking. However, the relationship between stressors and adverse health outcomes was not mediated by coping style in all cases, suggesting that certain stressor types appear to influence health outcomes whether or not an individual displays a propensity toward positive or negative coping with stress.

Depression emerged as a significant outcome associated with all stressor types, including work-related, family-related, financial and health-related sources of stress, as well as perpetration of violence. This finding suggests that women may "internalize" their stress responses, most often manifesting the effects of stress in an adverse psychological rather than behavioral outcome, such as substance abuse. In this regard, military women are not dissimilar to women in other study populations. Although depression in itself is of concern as an adverse psychological outcome related to stress, findings suggest that depression may affect military women's ability to function at work.

As expected, certain demographic factors also appeared to play a role in influencing some adverse health outcomes, particularly those related to substance use, independently of the effects of stressor types. Confirming prior research, marriage appeared to display a "protective" effect in military women, with married women less likely to report depression, heavier drinking, and illicit drug use. As is seen in most substance use research, white women were more likely than minority women to engage in heavier

drinking and heavy smoking. Younger women were more likely to drink and smoke heavily and to use illicit drugs.

Certain limitations to this analysis should be brought to bear in interpreting the implications of these findings. As mentioned previously, the authors were able to use a general measure of coping style rather than a measure of coping strategies in response to specific stress events. Thus, the findings would not precisely capture the situation-specific effects of coping strategies, nor would they explain how coping strategies might change over time. The coping style measure used in this analysis may have been most effective at elucidating potential relationships between coping and long-term sources of stress rather than event-specific, temporally isolated stressors. Moreover, this analysis offered an unprecedented examination of the effects of a wide and diverse range of stress types on a range of psychosocial and functional outcomes.

The findings of this study suggest that military health and mental health service providers should be attentive to the role that stress plays in influencing both physiological and psychological problems in military women. Interventions should not only focus on the "emotion-focused" coping responses to stress that are the centerpiece of many stress-reduction programs, but also focus on the behavior change and skills-building that will assist military women in changing the stressful situation or environment, whether it be related to work, financial, or family problems. In addition, military women share with all women the "predispositional" characteristics and life experiences that place women at risk of substance abuse problems and impaired functioning. Military-based counseling programs should be attentive to the underlying issues most closely associated with perpetration of violence in women, including childhood sexual or physical abuse survivor issues, and being a victim of domestic violence.

Findings of this study suggest that the physiological, functional, and psychological outcomes of stress differ based upon the types of stress military women experience. It follows that the solutions to and preventive interventions for these health problems are similarly diverse, ranging from those that may be directed toward improving the work environment, to those directed toward therapeutic mental health intervention. Assessment of sources of stress in military women's lives may provide valuable insights into the most appropriate and effective ways to reduce stress-related problems in military women.

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**Table 1: Demographic Characteristics of Military Women**

<b>Characteristic</b>	<b>Unweighted N</b>	<b>Weighted N</b>	<b>Percentage</b>
<b>Age</b>			
20 or younger	1,605	156,421	11.8
21-25	3,703	423,707	32.0
26-34	4,407	439,525	33.2
35 or older	6,478	305,743	23.1
<b>Race/Ethnicity</b>			
White	1,813	897,186	67.7
Black	704	227,656	17.2
Hispanic	258	113,181	8.5
Other	199	87,373	6.6
<b>Education</b>			
≤ H.S. graduate	796	487,252	36.8
Trade/tech graduate or some college	1,424	581,765	43.9
≥ College graduate	754	256,379	19.3
<b>Service</b>			
Army	868	422,246	31.9
Navy	864	382,017	28.8
Marine Corps	576	145,319	11.0
Air Force	848	375,814	28.4
<b>Job Status</b>			
Enlisted	2,355	1,118,464	84.4
Officer	619	206,651	15.6
<b>Marital Status</b>			
Married	1,581	798,950	53.2
Unmarried	1,393	526,446	46.8

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

**Table 2: Levels of Perceived Stress Among Military Women and Men**

Type of Stress/Level of Stress	Women	Men	Total DoD
<b>Stress at Work</b>			
Great deal	17.6	15.7	16.0
Fairly large amount	22.5	23.4	23.3
Some	30.7	29.7	29.8
A little	22.7	20.6	20.9
None	6.5	10.5	10.0
<b>Stress in Family</b>			
Great deal	13.4	8.8	9.3
Fairly large amount	15.9	12.7	13.1
Some	27.3	27.1	27.2
A little	26.9	30.6	30.1
None	16.6	20.8	20.3
<b>Stress Being a Woman in Military</b>			
Great deal	16.2	NA	16.2
Fairly large amount	16.8	NA	16.8
Some	35.4	NA	35.4
A little	18.4	NA	18.4
None	13.2	NA	13.2

Note: Table entries are column percentages of personnel who reported the indicated levels of stress in the past 12 months.

NA = Not applicable.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

**Table 3: Factors Associated with Depression**

<b>Independent Variables</b>	<b>Adjusted OR</b>	<b>Adjusted 95% CI</b>	<b>p</b>
<b>Work-related stress</b>			
High vs. low	2.6	2.0, 3.3	<.001
<b>Family-related stress</b>			
High vs. low	2.3	1.6, 2.8	<.001
<b>Financial stress</b>			
High vs. low	1.9	1.2, 2.5	<.001
<b>Health-related stress</b>			
High vs. low	1.6	1.1, 2.4	<.001
<b>Perpetration of violence vs. no violence</b>	1.9	1.5, 3.4	.001
<b>Negative coping style vs. positive style</b>	1.6	0.9, 1.8	<.001
<b>Health-related stress x negative coping style</b>			
High vs. low	4.7	1.3, 16.6	.014
<b>Heavier drinking vs. moderate, light or no drinking</b>	1.3	1.0, 1.6	.09
<b>Enlisted vs. officer status</b>	1.5	1.0, 2.2	.06
<b>Education</b>			
≤ H.S. vs. college grad.	1.5	1.0, 2.2	.14
> H.S. vs. college grad.	1.2	0.8, 0.7	
<b>Married vs. unmarried</b>	0.6	0.5, 0.8	<.001
<b>Service</b>			
Army vs. Air Force	1.1	0.9, 1.4	.45
Navy vs. Air Force	1.0	0.8, 1.2	
Marine vs. Air Force	1.2	1.0, 1.5	
<b>Race</b>			
White vs. other	0.7	0.5, 1.2	.04
Black vs. other	0.9	0.6, 1.6	
Hispanic vs. other	1.1	0.6, 1.9	
<b>Age</b>			
≤ 20 vs. ≥ 35	1.3	0.8, 1.9	.21
21-25 vs. ≥ 35	1.1	0.8, 1.4	
26-34 vs. ≥ 35	0.9	0.7, 1.1	

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

**Table 4: Factors Associated with Impaired Work Performance**

<b>Independent Variables</b>	<b>Adjusted OR</b>	<b>Adjusted 95% CI</b>	<b>p</b>
<b>Work-related stress</b>			
High vs. low	1.9	1.3, 2.6	<.001
<b>Family-related stress</b>			
High vs. low	1.0	0.8, 1.4	.84
<b>Financial stress</b>			
High vs. low	0.9	0.6, 1.4	.69
<b>Health-related stress</b>			
High vs. low	1.7	1.2, 2.3	.002
<b>Perpetration of violence vs. no violence</b>	1.3	0.8, 2.1	.33
<b>Negative coping style vs. positive style</b>	0.8	0.6, 1.1	.16
<b>Depression symptoms vs. no symptoms</b>	2.0	1.5, 2.7	<.001
<b>Heavier drinking vs. moderate, light or no drinking</b>	0.7	0.5, 1.0	.04
<b>Enlisted vs. officer status</b>	1.3	0.9, 1.9	.18
<b>Education</b>			
≤ H.S. vs. college grad.	1.1	0.6, 1.8	.67
> H.S. vs. college grad.	0.9	0.6, 1.5	
<b>Married vs. unmarried</b>	1.1	0.9, 1.5	.28
<b>Service</b>			
Army vs. Air Force	1.0	0.7, 1.3	.97
Navy vs. Air Force	1.0	0.7, 1.4	
Marine vs. Air Force	1.1	0.7, 1.6	
<b>Race</b>			
White vs. other	0.8	0.5, 1.3	.52
Black vs. other	0.7	0.4, 1.4	
Hispanic vs. other	0.7	0.4, 1.4	
<b>Age</b>			
≤ 20 vs. ≥ 35	1.0	0.7, 1.5	.10
21-25 vs. ≥ 35	1.1	0.8, 1.5	
26-34 vs. ≥ 35	0.7	0.6, 1.0	

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.



**Table 5: Factors Associated with Heavier Drinking**

<b>Independent Variables</b>	<b>Adjusted OR</b>	<b>Adjusted 95% CI</b>	<b>p</b>
<b>Work-related stress</b>			
High vs. low	1.2	1.0, 1.6	.22
<b>Family-related stress</b>			
High vs. low	0.9	0.7, 1.1	.24
<b>Financial stress</b>			
High vs. low	1.6	1.2, 2.1	.001
<b>Health-related stress</b>			
High vs. low	0.8	0.5, 1.1	.15
<b>Perpetration of violence vs. no violence</b>	1.8	1.2, 2.9	.009
<b>Negative coping style vs. positive style</b>	1.0	0.8, 1.3	.85
<b>Depression symptoms vs. no symptoms</b>	1.2	1.0, 1.6	.09
<b>Heavy smoker vs. not a heavy smoker</b>	2.1	1.5, 3.0	<.001
<b>Enlisted vs. officer status</b>	0.6	0.4, 0.9	.01
<b>Education</b>			
≤ H.S. vs. college grad.	1.8	1.1, 2.8	.03
> H.S. vs. college grad.	1.4	0.9, 2.1	
<b>Married vs. unmarried</b>	0.6	0.5, 0.8	<.001
<b>Service</b>			
Army vs. Air Force	1.2	0.9, 1.5	.37
Navy vs. Air Force	1.2	0.9, 1.7	
Marine vs. Air Force	1.1	0.8, 1.4	
<b>Race</b>			
White vs. other	2.1	1.2, 3.8	<.001
Black vs. other	1.0	0.5, 1.7	
Hispanic vs. other	1.9	1.0, 3.7	
<b>Age</b>			
≤ 20 vs. ≥ 35	0.7	0.5, 0.9	<.001
21-25 vs. ≥ 35	1.5	1.1, 2.0	
26-34 vs. ≥ 35	1.3	1.0, 1.8	

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

**Table 6: Factors Associated with Illicit Drug Use**

<b>Independent Variables</b>	<b>Adjusted OR</b>	<b>Adjusted 95% CI</b>	<b>p</b>
<b>Work-related stress</b>			
High vs. low	1.4	0.9, 2.4	.15
<b>Family-related stress</b>			
High vs. low	1.1	0.6, 1.9	.76
<b>Financial stress</b>			
High vs. low	1.8	1.0, 3.1	.03
<b>Health-related stress</b>			
High vs. low	0.9	0.5, 1.4	.56
<b>Perpetration of violence vs. no violence</b>	2.2	1.3, 3.7	.005
<b>Negative coping style vs. positive style</b>	1.0	0.6, 1.7	.96
<b>Depression symptoms vs. no symptoms</b>	1.2	0.7, 2.1	.47
<b>Heavy smoker vs. not a heavy smoker</b>	3.0	1.9, 4.7	<.001
<b>Enlisted vs. officer status</b>	0.9	0.3, 2.5	.80
<b>Education</b>			
≤ H.S. vs. college grad.	1.2	0.4, 3.9	.92
> H.S. vs. college grad.	1.2	0.4, 3.6	
<b>Married vs. unmarried</b>	0.7	0.4, 1.0	.03
<b>Service</b>			
Army vs. Air Force	2.0	1.1, 3.3	.005
Navy vs. Air Force	2.4	1.3, 4.5	
Marine vs. Air Force	1.7	0.9, 3.0	
<b>Race</b>			
White vs. other	0.5	0.3, 1.0	.04
Black vs. other	0.4	0.2, 0.9	
Hispanic vs. other	0.3	0.1, 0.9	
<b>Age</b>			
≤ 20 vs. ≥ 35	2.3	1.1, 4.6	.002
21-25 vs. ≥ 35	2.2	1.2, 3.8	
26-34 vs. ≥ 35	0.8	0.3, 1.7	

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

**Table 7: Factors Associated with Heavy Cigarette Use**

<b>Independent Variables</b>	<b>Adjusted OR</b>	<b>Adjusted 95% CI</b>	<b><i>p</i></b>
<b>Work-related stress</b>			
High vs. low	0.8	0.5, 1.4	.61
<b>Family-related stress</b>			
High vs. low	1.2	0.8, 1.7	.53
<b>Financial stress</b>			
High vs. low	1.8	1.2, 2.7	<.001
<b>Health-related stress</b>			
High vs. low	1.1	0.7, 1.8	.74
<b>Perpetration of violence vs. no violence</b>	1.3	0.6, 2.5	.14
<b>Negative coping style vs. positive style</b>	0.5	0.3, 0.9	.01
<b>Depression symptoms vs. no symptoms</b>	1.2	0.8, 1.7	.34
<b>Heavier drinking vs. moderate, light or no drinking</b>	2.1	1.5, 3.0	<.001
<b>Work-related stress x negative coping style</b>			
High vs. low	4.1	1.6, 11.0	.003
<b>Enlisted vs. officer status</b>	1.8	0.6, 5.0	.28
<b>Education</b>			
≤ H.S. vs. college grad.	5.4	1.9, 15.4	.009
> H.S. vs. college grad.	4.5	1.8, 11.4	
<b>Married vs. unmarried</b>	0.9	0.6, 1.2	.30
<b>Service</b>			
Army vs. Air Force	1.4	0.9, 2.2	.10
Navy vs. Air Force	1.5	1.1, 2.2	
Marine vs. Air Force	1.4	0.9, 2.2	
<b>Race</b>			
White vs. other	2.3	1.2, 4.4	<.001
Black vs. other	0.5	0.2, 1.1	
Hispanic vs. other	0.4	0.1, 1.2	
<b>Age</b>			
≤ 20 vs. ≥ 35	0.3	0.2, 0.5	<.001
21-25 vs. ≥ 35	0.2	0.2, 0.4	
26-34 vs. ≥ 35	0.4	0.2, 0.6	

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

**APPENDIX B**  
**CONFERENCE PRESENTATIONS**

## **Comparisons of Heavy Alcohol Use Among Military and Civilian Men and Women, 1985-1992**

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Robert M. Bray, PhD  
Research Triangle Institute

Mary Ellen Marsden, PhD  
Brandeis University

Larry A. Kroutil, MPH  
Research Triangle Institute

Paper presented at the 123rd Annual Meeting of the  
American Public Health Association, San Diego, CA, October 1995

### **Background**

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- U.S. Military has a longstanding concern for health of its members
- Military has policies and programs to prevent, deter, and treat alcohol abuse
- Data from a series of military worldwide surveys provide data to monitor trends in use
- Understanding and interpreting military heavy drinking rates requires comparisons with civilian data

## **Data Sources**

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- Military — Worldwide Surveys of Substance Abuse and Health Behaviors
  - 1985 N = 17,328
  - 1988 N = 18,763
  - 1992 N = 16,395
- Civilian — National Household Surveys on Drug Abuse
  - 1985 N = 8,038
  - 1988 N = 8,814
  - 1992 N = 28,832

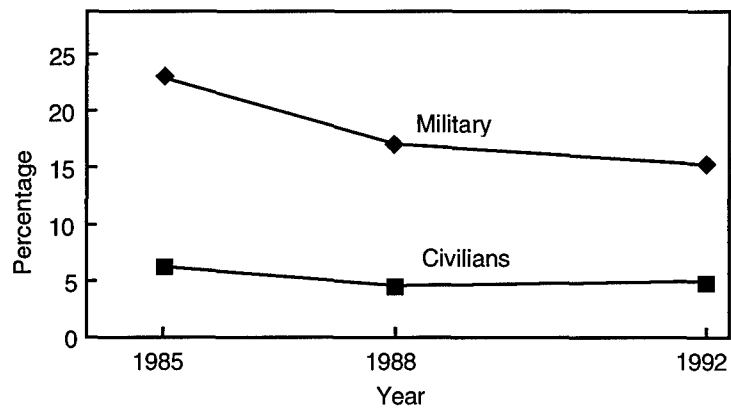
## **Definition of Heavy Alcohol Use**

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- Consumption of 5 or more drinks per day at least once a week during the past 30 days

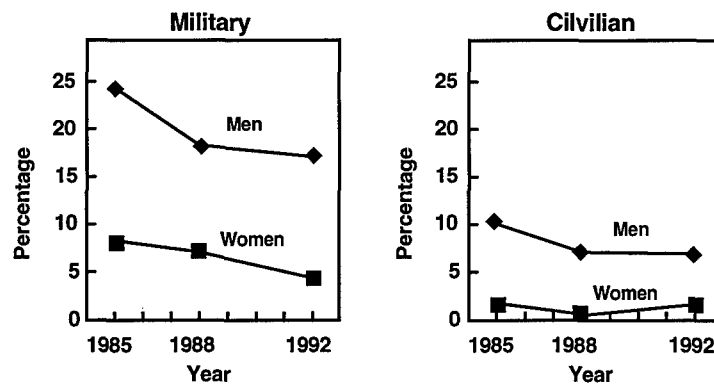
### Heavy Alcohol Use Among Military Personnel and Civilians, 1985 - 1992

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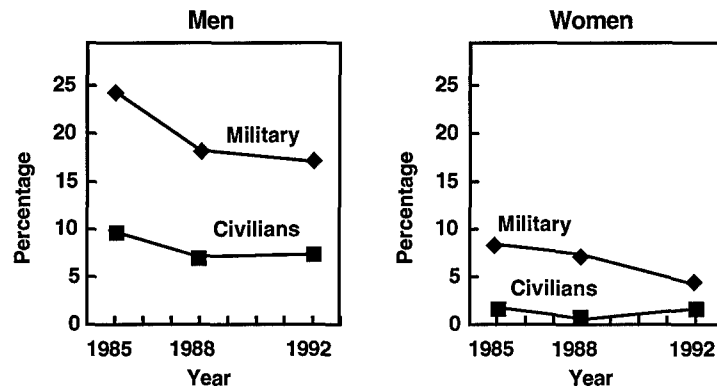
### Heavy Alcohol Use Among Military Men and Women and Among Civilian Men and Women, 1985-1992

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## Heavy Alcohol Use Among Military and Civilian Men and Women, 1985-1992

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## Limitations of Unstandardized Comparisons

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- Don't control for variation in age and location between data sets
  - Military personnel are younger than civilians
  - Military data collected worldwide; civilian data collected nationally
- Don't take into account potential overlap of the populations
  - Some military personnel included in NHSDA
- Unstandardized comparisons may result in misleading conclusions



## Adjustments to Data Sets

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- Location — restricted military data to persons living in Continental U.S.
- Age — restricted to ages 18-55
- Population overlap — excluded military personnel from civilian data

## Resulting Adjusted Data

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Year	Military N	Civilian N
1985	8,084	4,894
1988	10,407	4,742
1992	8,383	20,209

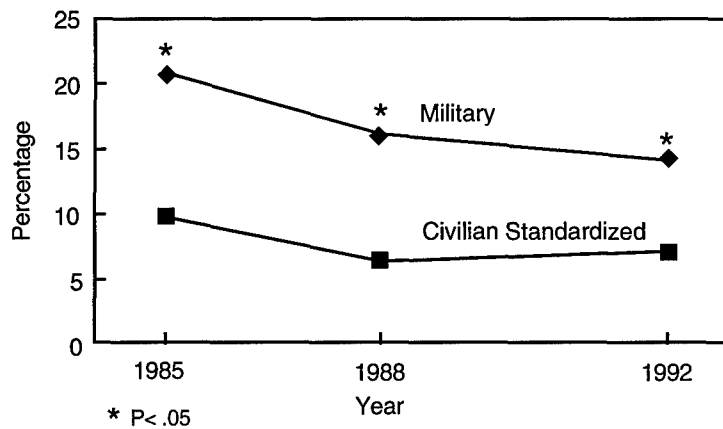
**Estimates of Selected Sociodemographic  
Characteristics of Military Personnel and Civilians,  
aged 18-55, 1985-1992**

Characteristic	Year/Population					
	1985		1988		1992	
	Military N=8,084	Civilian N=4,894	Military N=10,407	Civilian N=4,742	Military N=8,383	Civilian N=20,209
<b>Sex</b>						
Male (%)	91	49	89	47	85	49
<b>Age</b>						
18 to 25 (%)	49	26	41	23	39	20
<b>Race/Ethnicity</b>						
White (%)	73	80	71	77	68	76
<b>Education</b>						
More than High School (%)	54	43	60	42	60	48

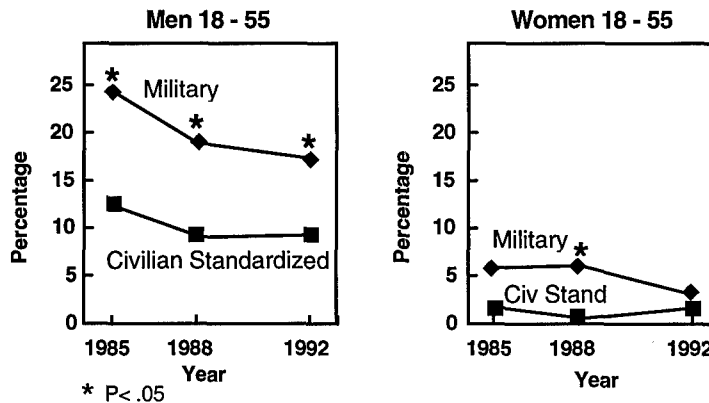
**Standardization Variables**

- Age
  - 18-25
  - 26-55
- Race/ethnicity
  - White
  - Black
  - Hispanic/Other
- Education
  - HS graduate or less
  - More than High School
- Marital Status
  - Married
  - Not Married
- Gender
  - Male
  - Female

### Heavy Alcohol Use Among Military Personnel and Civilians (Standardized), Ages 18-55, 1985-1992

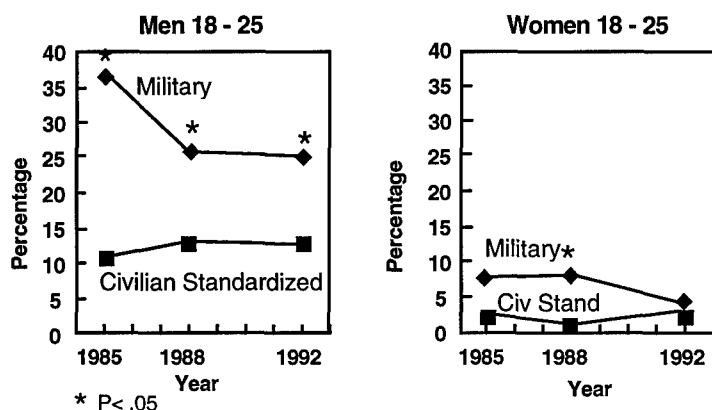


### Heavy Alcohol Use Among Military and Civilian (Standardized) Men and Women, Ages 18-55, 1985-1992



### Heavy Alcohol Use Among Military and Civilian (Standardized) Men and Women, Ages 18-25, 1985-1992

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### Summary of Findings

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- Rates of heavy drinking are declining in the military, but are relatively stable among civilians.
- Military rates are consistently higher than civilian standardized rates, but the gap is narrowing.
- Military men are more likely than civilian men to be heavy drinkers, but differences between military and civilian women are less apparent.
- Young military men (aged 18-25) are the age and gender group most likely to drink heavily. One in four drank heavily in 1992.
- Young military men show heavy drinking rates approximately two to three times those of their civilian counterparts.

## Conclusions

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- Differences in heavy drinking rates between military and civilians are due to reasons other than demographic composition
- Further investigation is needed to understand reasons for differences in rates between military and civilian men and between military men and women
- Possible reasons for differences may include
  - Different drinking attitudes and norms among military and civilian men
  - Different drinking attitudes and norms among military men and women
  - Differences in other aspects of military and civilian life

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# **Substance Use and Health Among Military Women and Men**

**Mary Ellen Marsden, Ph.D.  
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**Robert M. Bray, Ph.D.  
Larry A. Kroutil, M.P.H.**

**Research Triangle Institute  
Research Triangle Park, North Carolina**

Paper presented at the 104th Annual Convention of the American  
Psychological Association at Toronto, Canada, August 1996

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## **Background**

- Increasing proportion of women in military
  - Less than 10% women in early 1980s
  - Approximately 14% women in 1995
  - Women still comprise a substantial minority
- Expanded roles for women in military
  - Broader range of occupational specialties open to women
  - Approximately 33,000 women in combat-support roles in Persian Gulf War

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## Civilian Research Findings

- Men more likely than women to be illicit drug users.
- Men more likely than women to be heavy alcohol users.
- Gap in cigarette smoking is narrowing between men and women.
- Illicit drug use and smoking are decreasing, but heavy alcohol use is more stable.
- Substance users have poorer health and higher rates of health care utilization.
- Women more likely than men to report poor health and illness.
- Women more likely than men to use health services.

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## Sociodemographic Characteristics of Military Women and Men, 1995

Age	Women	Men
<b>20 and younger</b>	15.2	11.3
21 - 25	32.5	31.9
26 - 34	32.5	33.3
35 and older	19.9	23.5
<b>Race/Ethnicity</b>		
White	59.8	68.8
Black	25.6	16.0
Hispanic	7.9	8.6
Other	6.7	6.6

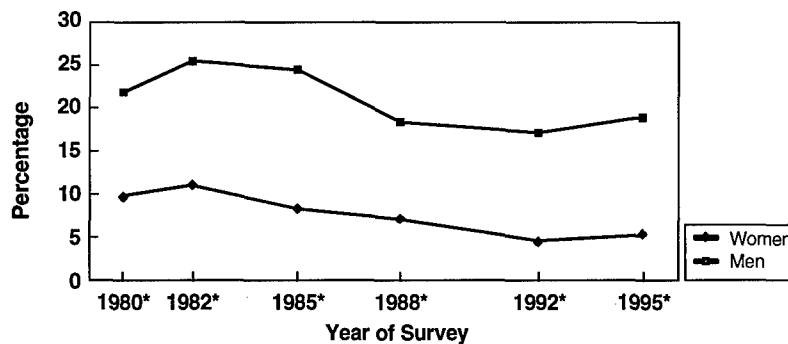
Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Sociodemographic Characteristics of Military Women and Men, 1995 (continued)...

Education	Women	Men
High school or less	27.6	38.1
Some college	50.7	42.9
College graduate	21.6	19.0
<b>Family Status</b>		
Not Married	49.0	38.4
Married, spouse not present	6.5	5.2
Married, spouse present	44.5	56.4
<b>Pay Grade</b>		
Officer	16.4	15.5
Enlisted	83.6	84.5

Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Trends in Heavy Alcohol Use Among Military Women and Men, 1980 - 1995

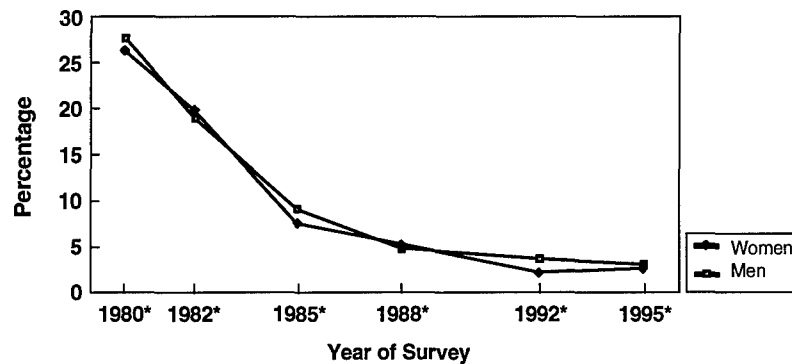


\* Significant .05 level

Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1980-1995.

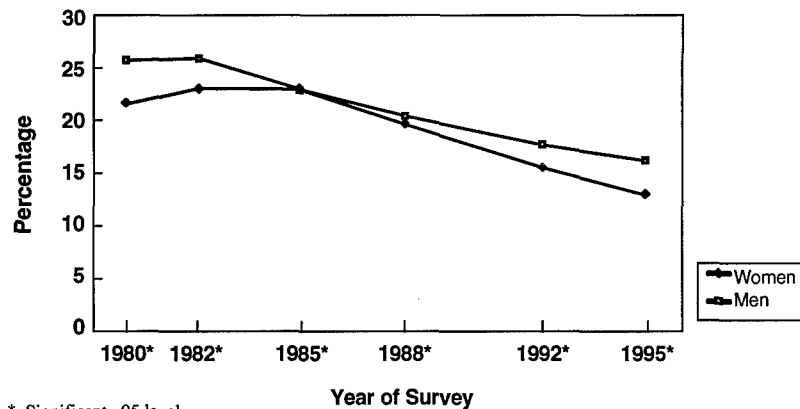


## Trends in Any Illicit Drug Use, Past 30 Days, Among Military Women and Men, 1980 - 1995



Source: DOD Surveys of Health Related Behaviors Among Military Personnel, 1980 to 1995.

## Trends in Cigarette Smoking, Past 30 Days, Among Military Women and Men, 1980 - 1995



\* Significant .05 level

Source: DOD Surveys of Health Related Behaviors Among Military Personnel, 1980 to 1995

## Health of Military Women and Men, 1995

	Women	Men	( $p \leq .05$ )
<b>Percent excellent or very good health</b>	59.2	65.5	*
<b>Number of days past 12 months</b>			
sick with symptoms	4.6	3.3	*
<b>Number of days in past 30</b>			
Physical health not good	2.8	2.2	*
Mental health not good	4.4	3.9	*
Physical or mental health not good	2.1	1.8	*

Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Health Care Utilization of Military Women and Men, 1995

	Women	Men	( $p \leq .05$ )
<b>Percent in past 12 months:</b>			
Hospital emergency room visit	38.3	27.8	*
Hospitalized for 1 or more nights	17.3	6.8	*
Hospitalized for 1 week or more	5.2	2.2	*
Number of outpatient physician visits	5.5	2.3	*

Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Substance Use and Indicators of Health Status

Substance	Number of Days Sick with Symptoms Past 12 Months		Number of Days Restricted Activity		Number of Outpatient Physician Visits	
	Women	Men	Women	Men	Women	Men
Illicit drug use		✓		✓		
Heavy alcohol use			✓		✓	
Cigarette smoking				✓		

✓ Significant predictor .05 level

Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Conclusions

- Illicit drug use and smoking are decreasing among military women and men, but heavy alcohol use is more stable
- Rates of illicit drug use and smoking are similar among military women and men, but men are much more likely to be heavy drinkers
- Military women are more likely to report illness and poorer health and use health services
- Among military women, heavy alcohol use is a predictor of illness and health care utilization; among military men, illicit drug use and smoking are predictors

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# **The Effects of Stress and Coping Style on Health Risk Behaviors and Functioning in Military Women**

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**Research Triangle Institute  
Research Triangle Park, North Carolina**

Paper presented at the 104th Annual Convention of the American  
Psychological Association at Toronto, Canada, August 1996

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## **Stress, and Coping Style: Relationship to Psychosocial and Functional Outcomes**

- Stress: predictive of substance abuse problems, depression, and decreased capacity to function effectively
- Relationship between stress and adverse health outcomes moderated by type of stressor, and by individuals' appraisal of the degree of stress associated with life events and chronic stressors
- Coping Style: an important mediator of the relationship between stress and adverse health outcomes
- Military women subject to a wide range of stressors as a part of military work assignments, and may experience stress associated with being a woman in a predominantly male environment

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## **Study Purpose**

1. Examine the effects of stressor types and coping style on
  - substance use problems
  - impaired work performance, and
  - symptoms of depression in military women.
2. Identify demographic and behavioral characteristics of military women at risk of stress-related problems

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## **Methods**

- **Multivariate logistic regression analysis**
- **N= 2974 women in all branches of Armed Forces**

### **Dependent Measures:**

**Impaired Work Performance:** On 7 or more work days in the past 12 months:

- was late for work by 30 minutes or more, or
- left work early for a reason other than errand or holiday, or
- was hurt in an on-the-job accident, or
- worked below normal level or performance, or
- did not come to work at all because of illness or personal accident

**Depression:** In the past 12 months:

- had two weeks or more in which "felt sad, blue, or depressed"
- felt sad or depressed much of the time

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## Dependent Measures (continued)

**Moderate to Heavy or Heavy Drinking:** Drinks 2-4 per typical drinking occasion at least once a week, or 5 or more drinks per typical drinking occasion 2-3 times per month; **OR** drinks 5 or more drinks per typical drinking occasion at least once a week.

**Illicit Drug Use:** Any use in the past 12 months of marijuana, PCP, LSD, cocaine, amphetamines, tranquilizers, barbiturates, heroin, analgesics, inhalants, or "designer drugs".

**Heavy Cigarette Use:** In the past 30 days, smoked one or more packs of cigarettes per day on a typical day.

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## Independent Measures

- At least once in the past 12 months, experienced "a fairly large amount" or "a great deal" of stress from:

**Work-related Stress:** Being deployed at sea or in the field, having a permanent change of station, problems in relationships with supervisor or co-workers, concern about being separated from the military, *or* increases in work load.

**Family-related Stress:** Being away from family, *or* changes in the family such as birth of a baby, a divorce, or a death in family.

**Financial Stress:** Problems with money *or* problems with housing.

**Health-related Stress:** Health problems in respondent *or* in family.

- **Perpetration of Violence:** At least once in past 12 months, got in a fight where hit someone other than family member, *or* hit spouse or date, *or* hit child(ren) for a reason other than discipline (spanking)

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## Independent Measures (continued)

Demographic Characteristics:	Age	20 or younger 21- 25 26- 34 35 or older
	Race/Ethnicity	White Black Hispanic Other
	Service	Army Navy Marine Corps Air Force
	Job Status	(Officer vs. enlisted)
	Marital Status	(Married vs. unmarried)

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## Independent Measures (continued)

### Coping: Potential Mediator of the Stress-Outcome Relationship

**Positive, action-oriented Coping Style:** When feeling "pressured, stressed, depressed, or anxious", report *frequently* (rather than sometimes, rarely or never)

- talk to a friend or family member; or
- exercise or play sports; or
- think of a plan to solve the problem.

**Negative Coping Style:** Non-frequent positive coping. Includes report of cigarette, alcohol or marijuana use, getting something to eat, or thinking about hurting or killing self.

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## Risk for Depression

<u>Significant Independent Measures</u>	<u>Odds Ratio</u>	<u>P</u>
Work-related Stress	2.57	<.001
Family-related Stress	2.27	<.001
Financial Stress	1.93	<.001
Health-related Stress	1.91	<.001
Perpetration of Violence	1.90	.001
Negative Coping Style	1.62	<.001
Health-related Stress x Negative Coping Style	4.69	.014

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## Risk for Impaired Work Performance

<u>Significant Independent Measures</u>	<u>Odds Ratio</u>	<u>P</u>
Work-related Stress	1.87	<.001
Health-related Stress	1.66	.002
Depression	1.99	<.001



## Risk for Moderate to Heavy or Heavy Alcohol Use

<u>Significant Independent Measures</u>		<u>Odds Ratio</u>	<u>P</u>
Financial Stress		1.56	.001
Perpetration of Violence		1.82	.009
Heavy Cigarette Use		2.10	<.001
Job Status	Officer	1.73	.011
Education Level	High School or less	1.79	.030
Marital Status	Unmarried	1.56	<.001
Race/Ethnicity	White	2.15	<.001
	Hispanic	1.94	
Age	20 or younger	0.65	<.001
	21-25	1.45	

## Risk for Illicit Drug Use

<u>Significant Independent Measures</u>		<u>Odds Ratio</u>	<u>P</u>
Financial Stress		1.78	.033
Perpetration of Violence		2.16	.005
Heavy Cigarette Use		2.99	<.001
Service	Army	1.95	.005
	Navy	2.44	
Marital Status	Unmarried	1.54	.035
Race/Ethnicity	White	0.49	.035
	Black	0.37	
	Hispanic	0.28	
Age	20 or younger	2.29	.002
	21-25	2.16	

## Risk for Heavy Cigarette Use

<u>Significant Independent Measures</u>		<u>Odds Ratio</u>	<u>P</u>
Financial Stress		1.97	<.001
Moderate to Heavy or Heavy Alcohol Use		2.11	<.001
Work-related Stress x Negative Coping Style		4.14	.003
Health-related Stress x Negative Coping Style		0.29	.039
Education Level	High School or less	5.25	.009
	Some college	4.30	
Race/Ethnicity	White	2.18	<.001
Age	20 or younger	0.30	<.001
	21-25	0.27	
	26-34	0.42	

## Main Conclusions

- Stressors highly predictive of a range of adverse psychosocial and functional outcomes, including depression and impaired work performance
- Demographic predictors vary by type of outcome; however, some trends apparent in substance use measures
- Coping style appears to interact with some stressors in affecting certain psychosocial and functional outcomes; however, the relationship between stressors and adverse health outcomes is not always mediated by a positive coping style.

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# **Health, Fitness, and Nutrition Among Military Women and Men**

**Robert M. Bray, Ph.D.**  
**Research Triangle Institute**  
**Research Triangle Park, North Carolina**

**Mary Ellen Marsden, Ph.D.**  
**Brandeis University**

Paper presented at Workshop on Assessing Readiness in  
Military Women: The Relationship to Nutrition.  
National Academies of Science and Engineering, Irvine, CA , September 9, 1996

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## **Background**

- Increasing proportion of women in military
  - Less than 10% women in early 1980s
  - Approximately 14% women in 1995
  - Women still comprise a substantial minority
- Expanded roles for women in military
  - Broader range of occupational specialties open to women
  - Approximately 33,000 women in combat-support roles in Persian Gulf War

---

## Worldwide Survey Series

Year	Research Organization	Sample Size	Response Rate
1980	Burt Associates	15,268	—
1982	Research Triangle Institute	21,936	84.3%
1985	Research Triangle Institute	17,328	80.4%
1988	Research Triangle Institute	18,673	81.4%
1992	Research Triangle Institute	16,395	77.3%
1995	Research Triangle Institute	16,193	69.6%

---

## Objectives of the 1995 Survey

- Assess the prevalence, correlates, and trends in substance use
- Compare military and civilian rates of substance use
- Identify demographic and behavioral characteristics of substance users
- Assess health practices, behaviors, and attitudes
- Establish baseline data for selected *Healthy People 2000* objectives

---

## **Sampling Design**

- Stage 1: Selection of military installations located worldwide, stratified by Service and region of the world
- Stage 2: Selection of active duty personnel at selected installations, stratified by pay grade and gender
- Exclusions: Recruits, Service academy students, personnel absent without leave (AWOL), or personnel undergoing permanent change of station (PCS)

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## **Field Data Collection Methods**

- Phase 1: Administration of anonymous questionnaires  
of questionnaires in 1995)  
Approximate completion time: 50 min.
- Phase 2: Mail-out of questionnaires to eligible participants from Phase 1
- No further follow-up of nonrespondents due to anonymous nature of the survey

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## Data Sources and Sample Sizes

### ■ 1992 Survey

Women	N	=	1,948
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Men	N	=	14,447
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### ■ 1995 Survey

Women	N	=	2,974
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Men	N	=	13,219
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## Sociodemographic Characteristics of Military Women and Men, 1995

Age	Women	Men
20 and younger	15.2	11.3
21 - 25	32.5	31.9
26 - 34	32.5	33.3
35 and older	19.9	23.5
<b>Race/Ethnicity</b>		
White	59.8	68.8
Black	25.6	16.0
Hispanic	7.9	8.6

*Source:* Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Sociodemographic Characteristics of Military Women and Men, 1995 (continued)...

Education	Women	Men
High school or less	27.6	38.1
Some college	50.7	42.9
College graduate	21.6	19.0
<b>Family Status</b>		
Not Married	49.0	38.4
Married, spouse not present	6.5	5.2
Married, spouse present	44.5	56.4
<b>Pay Grade</b>		
Officer	16.4	15.5
Enlisted	83.6	84.5

*Source:* Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Selected Health Indicators, 1995

	Women	Men	( $p \leq .05$ )
Percent excellent or very good health	59.2	65.5	*
Number of days past 12 months sick with symptoms	4.6	3.3	*
<b>Number of days in past 30</b>			
Physical health not good	2.8	2.2	*
Mental health not good	4.4	3.9	*
Physical/mental health restricted activity	2.1	1.8	*

*Source:* Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Other Health Indicators, 1995

	Women	Men
<b>Percent, lifetime prevalence of</b>		
High blood pressure	7.0	13.6*
High cholesterol	18.2	15.0*
<b>Percent current prevalence of overweight</b>		
Under 20	10.5	20.8*
20 - 25	5.6	12.8*
26 - 34	9.1	19.3*
35 and older	11.4	23.9*

\*p<.05 for women and men

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Strenuous Exercise, Past 30 days, 1995

Pay Grade	Women	Men
E1-E3	62.2	67.9
E4-E6	61.6	64.5
E7-E9	61.6	64.5
W1-W5	—	74.0
O1-O3	65.4	69.5
O4-O10	57.5	66.3*
Total	62.0	65.9

Note: Data are percentages of personnel who ran, cycled, vigorously walked or engaged in some other kind of strenuous exercise for 20 minutes or more three or more days a week in the past 30 days.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1995.



## Individual Health Practices, 1992 and 1995

Individual Practice	1992		1995	
	Women	Men	Women	Men
Moderate alcohol use or less	77.1	55.5*	78.9	55.8*
No other drug use in the past 12 months	96.6	93.3*	94.7	93.3*
Never smoked	45.3	37.3*	49.6	42.2*
Exercise twice a week or more	57.2	73.3*	67.4	72.6*
Eat two full meals a day at least 5 days a week	54.5	67.9*	60.9	71.8*
Sleep more than 6 consecutive hours a day at least 5 days a week	54.5	58.7*	56.4	55.7

\*p<.05 between women and men

Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1992 and 1995.

## Typical Food Consumption, Past 12 Months, 1992

	Women	Men
<b>Foods Low in Fat and Cholesterol</b>		
Low-fat dairy products (e.g. yogurt)	47.3	50.8
High-fiber grains (e.g., oatmeal)	49.7	50.7
Fruit (e.g., apples)	60.8	53.3*
Green or yellow vegetables (e.g., broccoli)	66.0	70.7*
Any of the above	87.0	87.6
<b>Foods High in Fat or Cholesterol</b>		
High-fat meats (e.g., hot dogs, hamburgers)	29.6	42.1*
High-fat dairy products (e.g., ice cream)	34.3	41.3*
Eggs or egg dishes (e.g., omelets)	19.6	30.8*
Fried foods (e.g., fried chicken)	36.4	45.6*
Any of the above	59.1	72.1*

\*p<.05 between women and men

Note: Data are percentages of persons eating a particular type of food several times a week or daily.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

## Health Risk Perceptions, 1992

Risk Factor	Women	Men
Having high blood cholesterol	90.4	84.8*
Having high blood pressure	95.2	92.1*
Being overweight	90.0	85.5*
Smoking cigarettes	95.5	90.1*
Not exercising regularly	73.0	73.0
Not eating a balanced diet	70.1	64.8*

\* $p < .05$  between women and men

*Note:* Data are percentages of individuals who believe that the factors listed above pose a "great risk" or a "moderate risk" to a person's health.

*Source:* Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

## Changes in Health Behavior From Screening or Education, 1992

Activity	Women	Men
Blood pressure check	13.7	14.1
Cholesterol check	23.0	31.1*
Personal fitness assessment <sup>a</sup>	27.6	27.7
Health Risk Appraisal (HRA)	25.2	22.7
Nutrition education or counseling	56.8	46.2*

\* $p < .05$  between women and men

*Note:* Data are percentages of persons making behavior changes due to participation in a particular activity.

<sup>a</sup> Does not include annual required personal fitness test.

*Source:* Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

## Specific Behavior Changes and Identified Risk Factors, 1992

Risk Factor	Women	Men
High blood pressure <sup>a</sup>	83.0	90.1
Overweight <sup>b</sup>	98.0	94.7*
Smoker, told to quit		
Any attempt <sup>c</sup>	42.1	43.4
Successful attempt <sup>d</sup>	3.7	3.3
Inadequate exercise <sup>e</sup>	50.8	45.6

P<.05 for women and men

<sup>a</sup> Identified as having high blood pressure and had dieted, cut down on sodium, exercised, stopped smoking, or cut down on alcohol in the past year.

<sup>b</sup> Identified as being overweight and had dieted, exercised, or cut down on alcohol in the past year.

<sup>c</sup> Smoker told to quit who had attempted to quit in the past year.

<sup>d</sup> Smoker told to quit who had successfully quit in the past year.

<sup>e</sup> Identified as not maintaining an adequate exercise program and, in the past 30 days, had engaged in strenuous physical activity for 20 minutes or longer, 3 days a week or more.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

## Conclusions

### Health Status

- Military women are more likely than military men to report poorer health and restricted activity

### Health Practices

- Both women and men are aware of risks of poor health practices, but differ in likelihood of engaging in these actions
- Military women are less likely than men to be substance users, but also less likely to engage in other healthy behaviors such as
  - strenuous exercise
  - eating at least two meals a day
  - getting adequate sleep
- Women less likely than men to eat high cholesterol foods

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## **Conclusions (cont)**

### **Taking Action**

- Both military women and men who have high blood pressure or who are overweight follow medical advice
- Fewer women and men change smoking or exercise habits when advised to do so

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# **Health and Health Care Utilization of Military Women and Men**

**Robert M. Bray, Ph.D.**  
**Research Triangle Institute**  
**Research Triangle Park, North Carolina**

**Mary Ellen Marsden, Ph.D.**  
**Brandeis University**

Paper presented at Conference on Psychosocial and Behavioral Factors in  
Women's Health: Research, Prevention, Treatment and Service Delivery.  
American Psychological Association and Other Agencies, September 19, 1996

---

## **Background**

- Increasing proportion of women in military
  - Less than 10% women in early 1980s
  - Approximately 14% women in 1995
  - Women still comprise a substantial minority
- Expanded roles for women in military
  - Broader range of occupational specialties open to women
  - Approximately 33,000 women in combat-support roles in Persian Gulf War

---

## **Civilian Research Findings**

- Civilian women more likely than civilian men to report poor health and illness.
- Civilian women more likely than civilian men to use health services.
- Less is known about health status and health care utilization among military women and men.

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## **Objectives of Presentation**

### **For Military Women and Men Compare**

- Health Status
- Health Practices
- Access to Health Care
- Health Care Utilization

---

## Worldwide Survey Series

Year	Research Organization	Sample Size	Response Rate
1980	Burt Associates	15,268	—
1982	Research Triangle Institute	21,936	84.3%
1985	Research Triangle Institute	17,328	80.4%
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---

## Objectives of the 1995 Survey

- Assess the prevalence, correlates, and trends in substance use
- Compare military and civilian rates of substance use
- Identify demographic and behavioral characteristics of substance users
- Assess health practices, behaviors, and attitudes
- Establish baseline data for selected *Healthy People 2000* objectives

---

## **Sampling Design**

- Stage 1: Selection of military installations located worldwide, stratified by Service and region of the world
- Stage 2: Selection of active duty personnel at selected installations, stratified by pay grade and gender
- Exclusions: Recruits, Service academy students, personnel absent without leave (AWOL), or personnel undergoing permanent change of station (PCS)

---

## **Field Data Collection Methods**

- Phase 1: Administration of anonymous questionnaires in group settings on-base (accounted for 88% of questionnaires in 1995)  
Approximate completion time: 50 min.
- Phase 2: Mail-out of questionnaires to eligible participants from Phase 1
- No further follow-up of nonrespondents due to anonymous nature of the survey



---

## Data Source and Sample Sizes

### ■ 1995 Survey

Women	N	=	2,974
Men	N	=	13,219

---

## Sociodemographic Characteristics of Military Women and Men, 1995

Age	Women	Men
20 and younger	15.2	11.3
21 - 25	32.5	31.9
26 - 34	32.5	33.3
35 and older	19.9	23.5
<b>Race/Ethnicity</b>		
White	59.8	68.8
Black	25.6	16.0
Hispanic	7.9	8.6
Other	6.7	6.6

*Source:* Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Sociodemographic Characteristics of Military Women and Men, 1995 (continued)...

Education	Women	Men
High school or less	27.6	38.1
Some college	50.7	42.9
College graduate	21.6	19.0
<b>Family Status</b>		
Not Married	49.0	38.4
Married, spouse not present	6.5	5.2
Married, spouse present	44.5	56.4
<b>Pay Grade</b>		
Officer	16.4	15.5
Enlisted	83.6	84.5

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Health Status Among Military Women and Men, Past 30 Days, 1995

Indicator	Women	Men
Physical Health Not Good	62.6	51.7*
Mental Health Not Good	67.5	55.1*
Physical/Mental Health Kept From Usual Activities	42.7	33.9*
Sick With Symptoms	73.1	59.9*
Did Not Come to Work Because of Illness or Personal Accident	36.0	19.5*

\*p<.05 between women and men.

Note: Data are percents of occurrences on one or more days.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Health Practices Among Military Women and Men, 1995

Practice	Women	Men
Moderate alcohol use or less	78.9	55.8*
No other drug use in the past 12 months	94.7	93.3*
Never smoked	49.6	42.2*
Exercise twice a week or more	67.4	72.6*
Eat two full meals a day at least 5 days a week	60.9	71.8*
Sleep more than 6 consecutive hours a day at least 5 days a week	56.4	55.7

\*p<.05 between women and men.

Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Strenuous Exercise, Past 30 days, 1995

Pay Grade	Women	Men
E1-E3	62.2	67.9
E4-E6	61.6	64.5
E7-E9	61.6	64.5
W1-W5	—	74.0
O1-O3	65.4	69.5
O4-O10	57.5	66.3 *
Total	62.0	65.9

Note: Data are percentages of personnel who ran, cycled, vigorously walked, or engaged in some other kind of strenuous exercise for 20 minutes or more three or more days a week in the past 30 days.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Health Care Utilization of Military Women and Men, 1995

	Women	Men
<b>Percent in past 12 months:</b>		
Outpatient physician visits	70.6	47.8*
Hospital emergency room visit	38.3	27.8*
Hospitalized for 1 or more nights	17.3	6.8*
Hospitalized for 1 week or more	5.2	2.2*
Overnight hospital stay for treatment of injury	3.4	3.4

\*p<.05 between women and men.

Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

## Access to and Satisfaction with Medical Care in the Military, 1995

	Women	Men
Easy to get medical care in Military <sup>1</sup>	84.1	78.6*
Easy to get medical care at this installation <sup>1</sup>	75.1	70.4*
Easy to get OB/GYN care in Military <sup>1</sup>	73.1	—
Easy to get OB/GYN care at this installation <sup>1</sup>	63.3	—
Satisfied with quality of medical care at this installation <sup>2</sup>	63.7	61.4
Satisfied with OB/GYN care at this installation <sup>2</sup>	62.3	—

\* p<.05 for women and men.

<sup>1</sup> Percent "very easy" or "easy to get medical care."

<sup>2</sup> Percent "very satisfied" or "satisfied".

---

## **Conclusions**

### **Health Status**

- Military women are more likely than military men to report poorer health and restricted activity

### **Health Practices**

- Military women are less likely than men to be substance users, but also less likely to engage in other healthy behaviors such as
  - strenuous exercise
  - eating at least two meals a day

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## **Conclusions (cont.)**

### **Access to Health Care**

- Women are significantly more likely than men to report easy access to medical care, but the majority of both say it is easy.
- The majority (about two thirds) of military women and men are satisfied with the quality of medical care they receive in the military

### **Health Care Utilization**

- Military women are more likely than military men to use health services



DEPARTMENT OF THE ARMY  
US ARMY MEDICAL RESEARCH AND MATERIEL COMMAND  
504 SCOTT STREET  
FORT DETRICK, MARYLAND 21702-5012

REPLY TO  
ATTENTION OF:

MCMR-RMI-S (70-1y)

28 Aug 02

MEMORANDUM FOR Administrator, Defense Technical Information  
Center (DTIC-OCA), 8725 John J. Kingman Road, Fort Belvoir,  
VA 22060-6218


SUBJECT: Request Change in Distribution Statement

1. The U.S. Army Medical Research and Materiel Command has reexamined the need for the limitation assigned to technical reports written for this Command. Request the limited distribution statement for the enclosed accession numbers be changed to "Approved for public release; distribution unlimited." These reports should be released to the National Technical Information Service.

2. Point of contact for this request is Ms. Kristin Morrow at DSN 343-7327 or by e-mail at Kristin.Morrow@det.amedd.army.mil.

FOR THE COMMANDER:

Encl

  
PHYLIS M. RINEHART  
Deputy Chief of Staff for  
Information Management

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